AXIOMTEK

IMB210 Series

Intel® Socket 1150 Xeon® E3/ Core™ i7/ i5/ i3/ Pentium®/ Celeron® Processors ATX Industrial Motherboard

User's Manual

RoHS

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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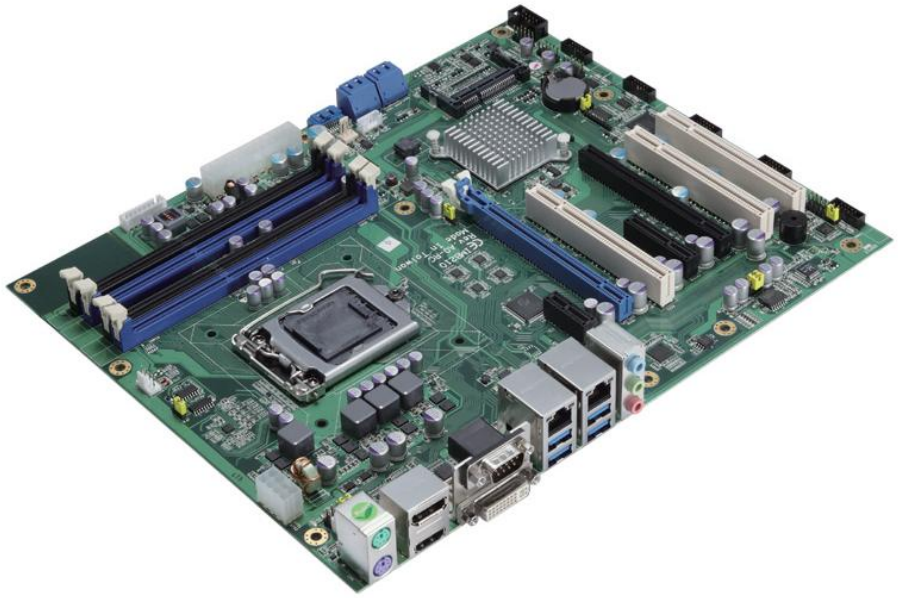
Chapter 1
Introduction



The IMB210 is an advanced ATX industrial motherboard based on the 4th Generation Intel® Xeon® E3/ Core™ i7/ i5/ i3/ Pentium®/ Celeron® processors (codename: Haswell) in LGA1150 socket with Intel® C226 PCH. The optimized IMB210 is specially designed for workstations through better computing and visual performance; ideally used in every major industry for tasks ranging from financial modeling to designing complex buildings and vehicles. With its built-in Intel® HD Graphics P4000, this industrial grade motherboard delivers great 3D visual performance with triple display capability through DisplayPort, HDMI and DVI-I ports demanded by professional-grade CAD and media/entertainment fields.

In addition, the IMB210 supports Intel® Turbo Boost 2.0 technology, Intel® Hyper-Threading technology, Intel® HD Graphics with DX11 support, 3-D Tri-Gate transistors, 32GB ECC DDR3 1600/1333MHz memory, and PCI-Express 3.0 x16 slot. It also features Intel® Active Management Technology 9.0 (iAMT), Trusted Platform Module 1.2 (TPM), SATA RAID, as well as PCI-Express x4 expansion making it ideal for applications with added security features.

1.1 Features

- LGA1150 socket 4th Generation Intel® Xeon® E3/ Core™ i7/ i5/ i3/ Pentium®/ Celeron® processors
- Intel® C226 PCH
- 4 DDR3 1333/1600MHz max. up to 32GB memory capacity
- Triple view display
- PCI-Express x16 Gen. 3 supported
- 5 SATA-600 with RAID 0, 1, 5 and 10
- 4 USB 3.0 supported
- TPM 1.2 supported
- iAMT9.0 supported

1.2 Specifications

- **CPU**
  - Intel® Xeon® E3/ Core™ i7/ i5/ i3/ Pentium®/ Celeron® processors.

- **System Chipset**
  - Intel® C226 PCH.

- **CPU Socket**
  - LGA1150 socket.

- **BIOS**
  - AMI BIOS via SPI interface with socket.

- **System Memory**
  - Four 240-pin DDR3 DIMM sockets.
  - Maximum up to 32GB DDR3 memory.
  - Support 1600/1333MHz ECC memory.

- **L3 Cache**
  - Varies with CPU.

- **Onboard Multi I/O**
  - Controller: NCT6106D.
  - Six serial ports: One is double-deck D-Sub with DVI-I connector on the rear I/O and supports RS-232/422/485. The other five ports are in 2x5-pin 2.0 pitch box headers. One port supports RS-232/422/485 (COM2) and the other four ports support RS-232 (COM3/4/5/6).

- **USB Interface**
  - Four USB 3.0 ports.
  - Six USB 2.0 ports.

- **Onboard Graphics**
  - Intel® HD Integrated Graphics.
  - Display memory: Max. shared system memory up to 1759MB.
  - One DisplayPort: Resolution max. up to 2048x1536 @ 75Hz.
  - One HDMI: Resolution max. up to 2048x1536 @ 75Hz.
  - One DVI-I: Resolution max. up to 1920x1200 @ 60Hz.

Note: ***Under Windows® operating system, if the installed external PCI-Express graphics card and onboard graphics are both enabled simultaneously, the video display configurations are controlled by each graphics driver individually. For example, in these circumtances, you are not allowed to set both external and onboard graphics to clone mode at the same time.***

- **Ethernet**
  - LAN1: Intel® i217LM supports 10/100/1000 Base-T Gigabit Ethernet with Wake-on-LAN, PXE Boot ROM and iAMT.
  - LAN2: Intel® i210AT, supports 10/100/1000 Base-T Gigabit Ethernet with Wake-on-LAN and PXE Boot ROM.

- **Serial ATA**
  - Five Serial ATA 3.0 ports (6Gb/s performance) with RAID 0/1/5/10.

- **Audio**
  - HD codec audio as MIC-in/line-in/line-out with Realtek ALC662.
  - Speaker-out with 1W/8ohm x 2.

- **Expansion Slot**
  - Two PCI-Express x16 Gen. 3 slots (one PCI-Express x16 or two PCI-Express x8 when using dual PCI-Express x8 concurrently).
  - One PCI-Express x4 Gen. 2.
  - One PCI-Express x1 Gen. 2.
  - Three PCI

- **CFast™ Socket**
  - One CFast™ Socket.

- **Watchdog Timer**
  - Reset supported (1~255 levels).

Note: ***All specifications and images are subject to change without notice.***

1.3 Utilities Supported

- Intel® chipset drivers
- Intel® graphics drivers
- Ethernet utility and drivers
- Intel® USB 3.0 drivers
- HD audio drivers
- RAID utility
- iAMT utility and drivers
- TPM utility

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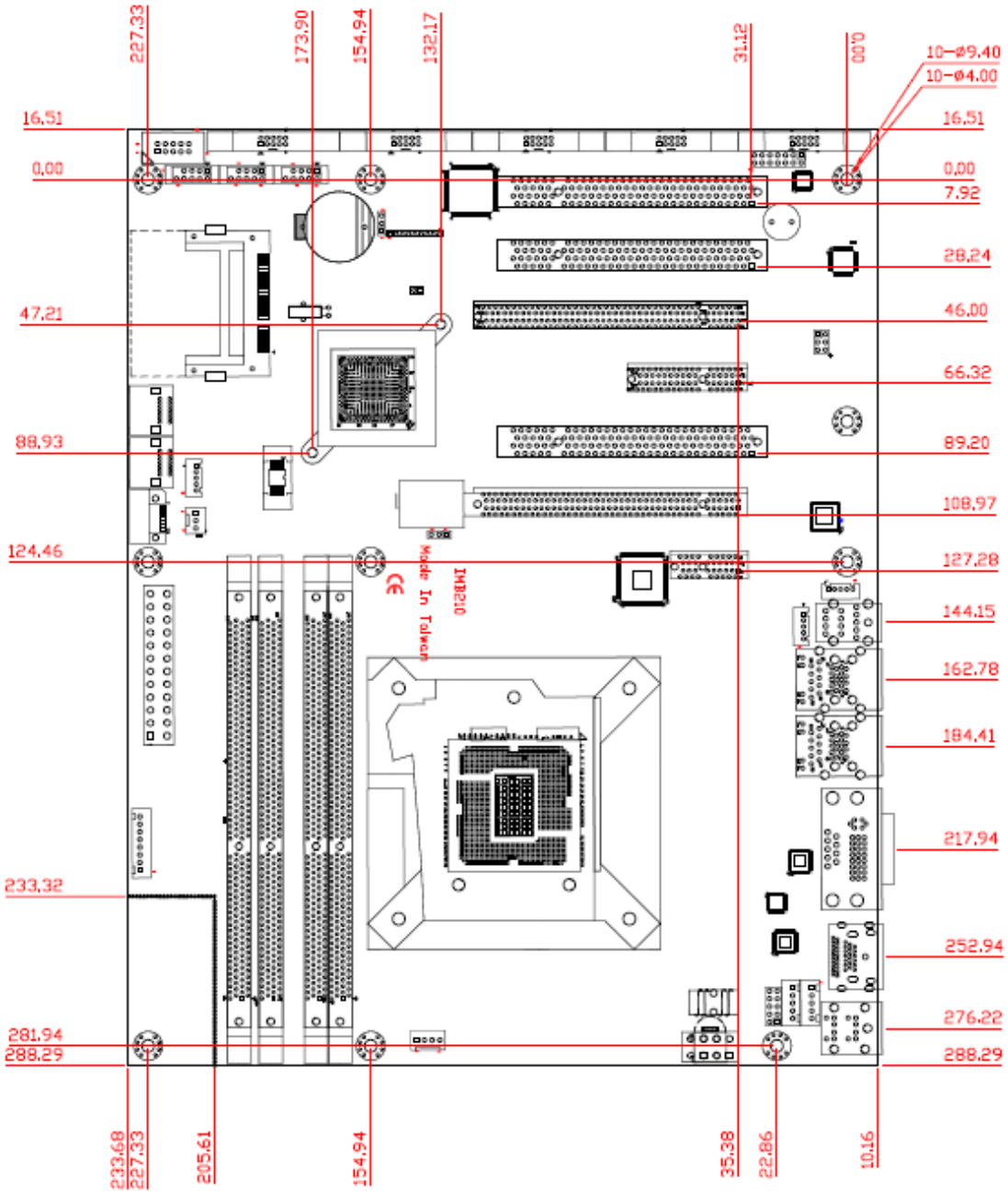
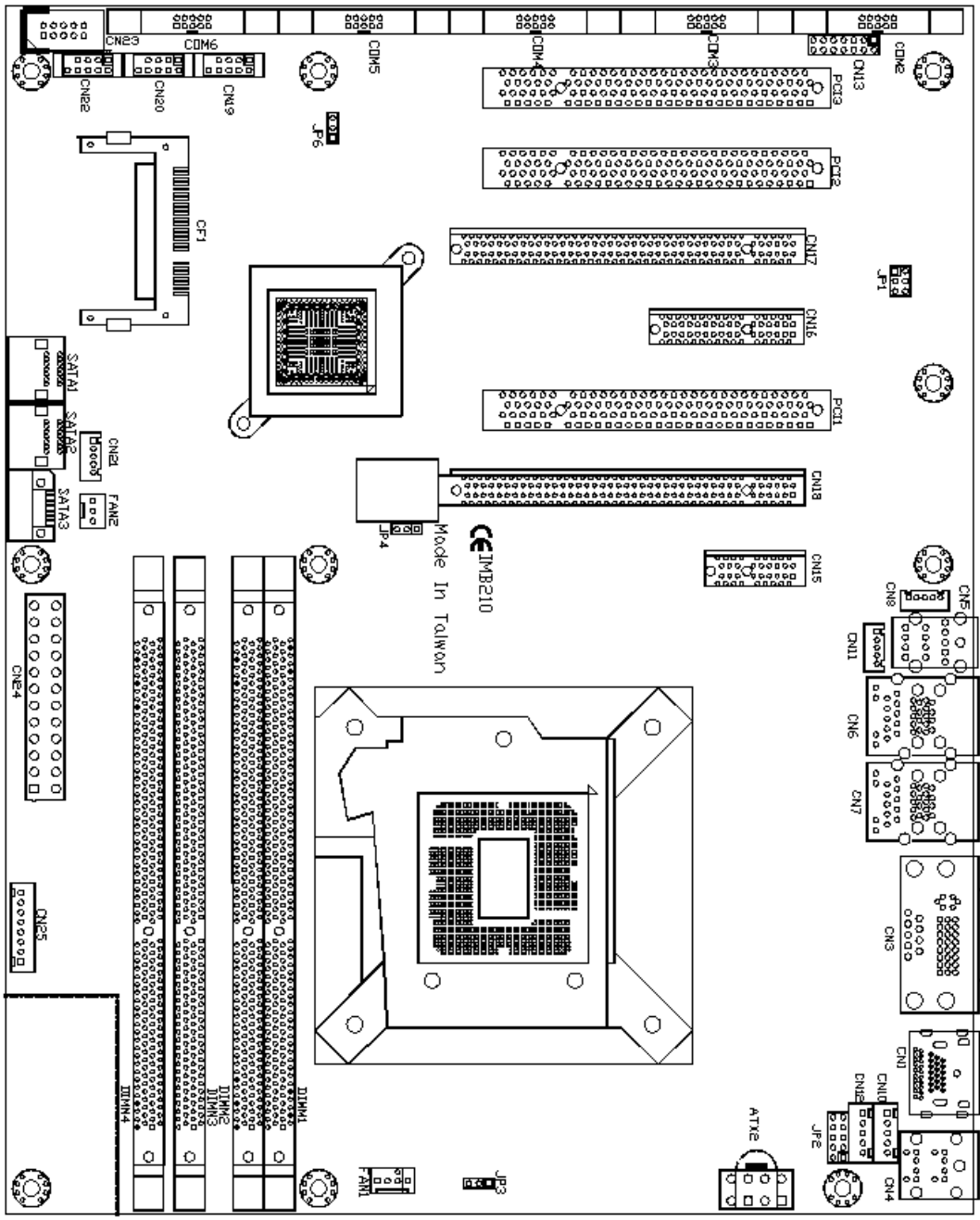
Chapter 2
Board and Pin Assignments

2.1 Board Dimensions and Fixing Holes



Top Side

2.2 Board Layout



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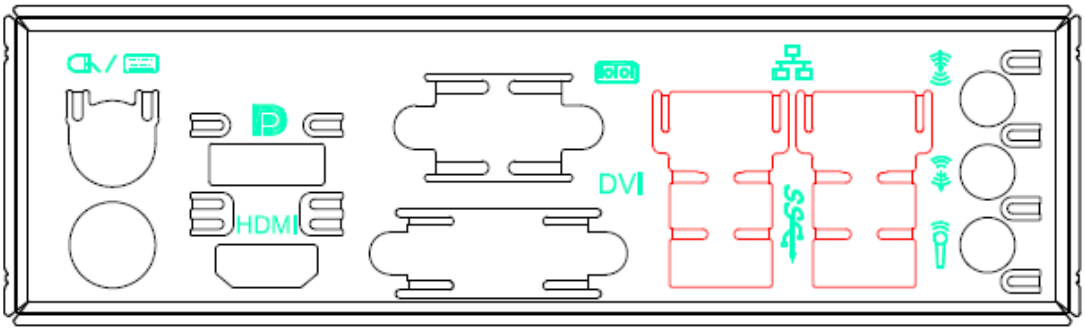
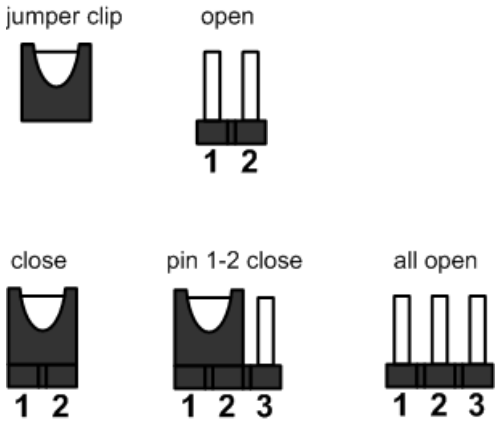


I/O Bracket

2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. The following illustration shows how to set up jumper.



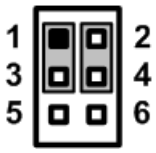
Before applying power to IMB210 Series, please make sure all of the jumpers are in factory default position. Below you can find a summary table of all jumpers and onboard default settings.

Jumper	Description		Jumper Setting
JP1	Audio Output Selection Default: Line-out		1-3, 2-4 Close
JP2	COM1 Data/Power Selection Default: RS-232 Data	CN3A Pin 1: DCD	7-9 Close
		CN3A Pin 9: RI	8-10 Close
JP3	Auto Power On Default: Disable		1-2 Close
JP4	PCI-Express Bifurcation Setting Default: One x16 PCI-Express		2-3 Close
JP6	Restore BIOS Optimal Defaults Default: Normal Operation		1-2 Close

2.3.1 Audio Output Selection (JP1)

JP1 is for user to select line-out or speaker-out as source for audio output on CN5. When speaker-out is used, it delivers 2W/channel continuous into 8 Ohm loads.

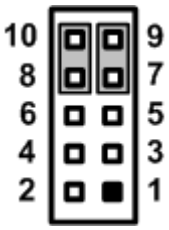
Function	Setting
Line-out (Default)	1-3, 2-4 close
Speaker-out (w/ amplifier)	3-5, 4-6 close



2.3.2 COM1 Data/Power Selection (JP2)

The COM1 has +5V or +12V power capability on DCD and RI by setting this jumper. This port supports RS-232/422/485 communication mode via BIOS setting. When COM1 is set to +5V or +12V, please make sure its communication mode is RS-232 (see section 5.4).

Function	Setting
Power: Set CN3A pin 1 to +12V	1-3 close
Power: Set CN3A pin 1 to +5V	5-7 close
Data: Set CN3A pin 1 to DCD (Default)	7-9 close
Power: Set CN3A pin 9 to +12V	2-4 close
Power: Set CN3A pin 9 to +5V	6-8 close
Data: Set CN3A pin 9 to RI (Default)	8-10 close



2.3.3 Auto Power On (JP3)

If JP3 is enabled for AC power input, the system will be automatically power on without pressing soft power button. If JP3 is disabled for AC power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Disable auto power on (Default)	1-2 close
Enable auto power on	2-3 close

2.3.4 PCI-Express Bifurcation Setting (JP4)

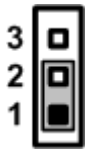
JP4 is for PCI-Express bifurcation setting. See table below for detailed information.

Function		Setting
Two x8 PCI-Express	Set CN17 to x8	1-2 close
	Set CN18 to x8	
One x16 PCI-Express (Default)	Set CN17 to OFF	2-3 close
	Set CN18 to x16	

2.3.5 Restore BIOS Optimal Defaults (JP6)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close



2.4 Connectors

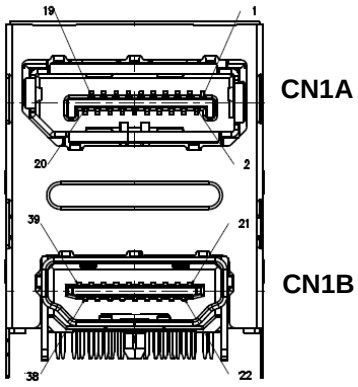
Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

Connector	Description
CN1	DisplayPort (CN1A) and HDMI (CN1B) Connector
CN3	COM1 D-Sub (CN3A) and DVI-I (CN3B) Connector
CN4	PS/2 Keyboard and Mouse Connector
CN5	HD Audio Jack
CN6	LAN2, USB 3.0 Port 2 and 3 Connector
CN7	LAN1, USB 3.0 Port 0 and 1 Connector
CN8	LAN2 Internal LEDs Connector
CN10	Internal Mouse Connector
CN11	LAN1 Internal LEDs Connector
CN12	Internal Keyboard Connector
CN13	Front Panel Connector
CN15	PCI-Express x1 Slot
CN16	PCI-Express x4 Slot
CN17~18	PCI-Express x16 Slots
CN19	USB 2.0 Port 2 and 3 Connector
CN20	USB 2.0 Port 6 and 7 Connector
CN21	SMBus Connector
CN22	USB 2.0 Port 8 and 9 Connector
CN23	Digital I/O Port Connector
CN24	24-pin ATX Power Connector
CN25	Internal Power Connector
ATX2	8-pin +12V ATX Power Connector
CF1	CFast™ Socket
DIMM1~4	DDR3 DIMM Connectors
COM2~6	COM2~COM6 Connectors
FAN1	CPU Fan Connector
FAN2	System Fan Connector
PCI1~3	PCI1, PCI2 and PCI3 Slots
SATA1	Serial ATA 3.0 port 0 and 1 Connector
SATA2	Serial ATA 3.0 port 2 and 3 Connector
SATA3	Serial ATA 3.0 port 4 Connector

2.4.1 DisplayPort and HDMI Connector (CN1)

CN1 is a double-deck connector comprising an upper connector for DisplayPort (CN1A) and a lower connector for HDMI (CN1B).

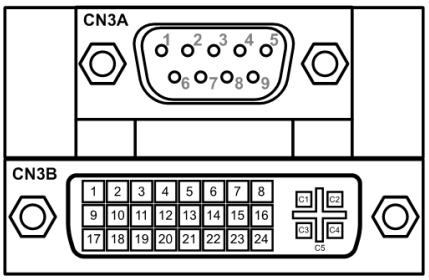
Pin	Signal	Pin	Signal
1	LANE 0	21	DATA2
2	GND	22	GND
3	LANE 0#	23	DATA2#
4	LANE 1	24	DATA1
5	GND	25	GND
6	LANE 1#	26	DATA1#
7	LANE 2	27	DATA0
8	GND	28	GND
9	LANE 2#	29	DATA1#
10	LANE 3	30	Clock
11	GND	31	GND
12	LANE 3#	32	Clock#
13	Detect Pin	33	NC
14	GND	34	NC
15	AUX CH	35	SCL
16	GND	36	SDA
17	AUX CH#	37	GND
18	Hot Plug Detect	38	+5V POWER
19	GND	39	Hot Plug Detect
20	DP_PWR(3.3V)		



2.4.2 COM1 and DVI-I Connector (CN3)

CN3 is a double-deck connector comprising an upper connector for COM1 port (CN3A) and a lower connector for DVI-I port (CN3B). The DVI-I (Digital Video Interface – Integrated) provides transmission of fast and high quality video signal between source device (graphic card) and display device (monitor). The DVI-I interface supports both digital and analog.

Pin	CN3A Signal
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)



Pin	CN3B Signal	Pin	CN3B Signal
1	TX2-	2	TX2+
3	Ground	4	NC
5	NC	6	DVI_SPD_CLK
7	DVI_SPD DATA	8	CRT-VSYNC
9	TX1-	10	TX1+
11	Ground	12	NC
13	NC	14	VGAVCC
15	Ground	16	FPDETECT
17	TX0-	18	TX0+
19	Ground	20	NC
21	NC	22	Ground
23	TXC+	24	TXC-
C1	CRT-RED	C2	CRT-GREEN
C3	CRT-BLUE	C4	CRT-HSYNC
C5	VGAGND		

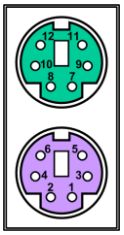
The COM1 port supports RS-232/422/485 communication mode. The pin assignments of RS-422/RS-485 are listed in table below. If you need COM1 to support RS-422 or RS-485 mode, please refer to section 5.4.

Pin	RS-422	RS-485
1	TX-	Data-
2	TX+	Data+
3	RX+	No use
4	RX-	No use
5	No use	No use
6	No use	No use
7	No use	No use
8	No use	No use
9	No use	No use

2.4.3 PS/2 Keyboard and Mouse Connector (CN4)

The board has two 6-pin mini-DIN PS/2 connectors; green for mouse and purple for keyboard.

Pin	Signal	Pin	Signal
1	K/B Data	7	M/S Data
2	NC	8	NC
3	GND	9	GND
4	+5V	10	+5V
5	K/B CLK	11	M/S CLK
6	NC	12	NC



2.4.4 HD Audio Jack (CN5)

Install audio driver, and then attach audio devices to CN5.

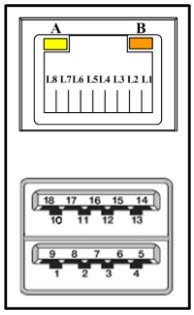
Pin Color	Signal
Blue	Line-in
Green	Line-out
Pink	MIC-in

2.4.5 LAN and USB 3.0 Connectors (CN6 and CN7)

The board comes with two high performance plug and play Ethernet interfaces which are fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end to a 1000/100/10-Base-T hub.

The Universal Serial Bus (compliant with USB 3.0 (5Gb/s)) connectors on the rear I/O are for installing USB peripherals such as keyboard, mouse, scanner, etc. Note that the CN6 carries LAN2, USB 3.0 port 2 and 3 signals while CN7 carries LAN1, USB 3.0 port 0 and 1 signals.

Pin	Signal	Pin	Signal
L1	MDI0+	L5	MDI2+
L2	MDI0-	L6	MDI2-
L3	MDI1+	L7	MDI3+
L4	MDI1-	L8	MDI3-
A	100 LAN LED (Green)/ 1000 LAN LED (Orange)		
B	Active LED		

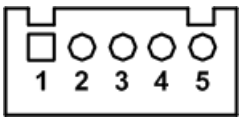


Pin	USB Signal (from PCH)	Pin	USB Signal (from PCH)
1	USB_VCC (+5V power)	10	USB_VCC (+5V power)
2	USB_Data0-	11	USB_Data1-
3	USB_Data0+	12	USB_Data1+
4	GND	13	GND
5	SSRX0-	14	SSRX1-
6	SSRX0+	15	SSRX1+
7	GND	16	GND
8	SSTX0-	17	SSTX1-
9	SSTX0+	18	SSTX1+

2.4.6 LAN Internal LEDs Connectors (CN8 and CN11)

The CN8 and CN11 are LAN2 and LAN1 internal LEDs connectors, respectively.

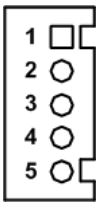
Pin	Signal
1	Activity link LED(+)
2	Activity link LED(-)
3	100Mbps speed LED, low active
4	+3.3V level standby power
5	1GMbps speed LED, low active



2.4.7 Internal Mouse Connector (CN10)

The internal mouse interface is available through a 5-pin connector.

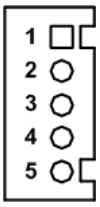
Pin	Signal
1	Mouse Clock
2	Mouse Data
3	NC
4	GND
5	+5V level



2.4.8 Internal Keyboard Connector (CN12)

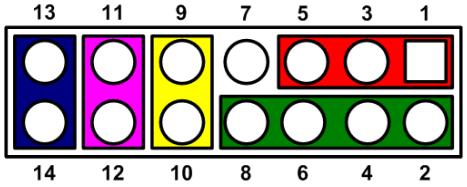
The internal keyboard interface is available through a 5-pin connector.

Pin	Signal
1	Keyboard Clock
2	Keyboard Data
3	NC
4	GND
5	+5V level



2.4.9 Front Panel Connector (CN13)

Pin	Signal
1	PWRLED+
2	EXT SPK-
3	GND
4	Buzzer
5	PWRLED-
6	N.C.
7	N.C.
8	EXT SPK+
9	PWRSW-
10	PWRSW+
11	HW RST-
12	HW RST+
13	HDDLED-
14	HDDLED+



Power LED
Pin 1 connects anode(+) of LED and pin 5 connects cathode(-) of LED. The power LED lights up when the system is powered on. The pin 3 is defined as GND.

External Speaker and Internal Buzzer
Pin 2, 4, 6 and 8 connect the case-mounted speaker unit or internal buzzer. While connecting the CPU board to an internal buzzer, please set pin 2 and 4 closed; while connecting to an external speaker, you need to set pins 2 and 4 opened and connect the speaker cable to pin 8(+) and pin 2(-).

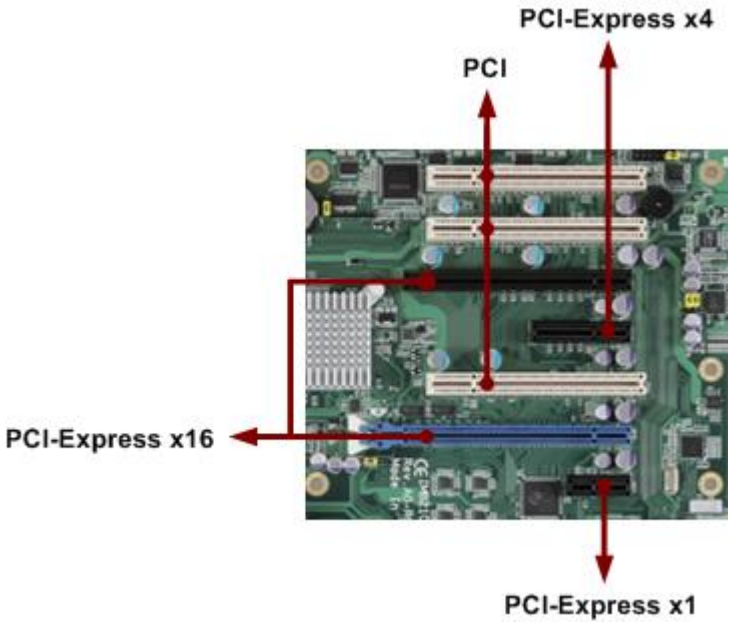
Power On/Off Button
Pin 9 and 10 connect the power button on front panel to the CPU board, which allows users to turn on or off power supply.

System Reset Switch
Pin 11 and 12 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

HDD Activity LED
This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, pin 13 is assigned as cathode(-) and pin 14 is assigned as anode(+).

2.4.10 PCI and PCI-Express Slots (PCI1~3 and CN15~18)

The PCI and PCI-Express slots support cards such as LAN card, SCSI card, USB card and other cards that comply with PCI specifications. Refer to image below for the location of the slots.

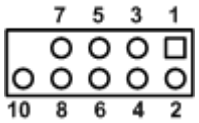


2.4.11 USB 2.0 Connectors (CN19, CN20 and CN22)

The CN19, CN20 and CN22 are interfaces carrying USB port 2 and 3, USB port 6 and 7, USB port 8 and 9 respectively. They are for installing versatile USB 2.0 compliant peripherals. These connectors are designed with +5V level standby power which can provide power when system is in suspend mode.

Pin	Signal	Pin	Signal
1	USB VCC (+5V level standby power)	2	USB VCC (+5V level standby power)
3	USB DX-	4	USB DY-
5	USB DX+	6	USB DY+
7	GND	8	GND
		10	GND

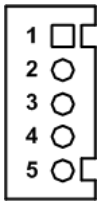
CN19,CN20,CN22



2.4.12 SMBus Connector (CN21)

This connector is for SMBus interface. The SMBus (System Management Bus) is a simple bus for the purpose of lightweight communication. Most commonly it is used for communication with the power source related applications such as on/off instructions.

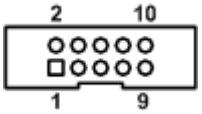
Pin	Signal
1	SMB_CLOCK
2	NC
3	GND
4	SMB_DATA
5	+5V



2.4.13 Digital I/O Port Connector (CN23)

The board is equipped with an 8-channel digital I/O connector that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals.

Pin	Signal	Pin	Signal
1	DIO 5	2	DIO 1
3	DIO 6	4	DIO 2
5	DIO 7	6	DIO 3
7	DIO 8	8	DIO 4
9	GND	10	GND



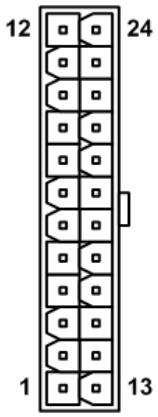
2.4.14 ATX Power Connectors (CN24 and ATX2)

Steady and sufficient power can be supplied to all components on the board by connecting power connector. Please make sure all components and devices are properly installed before connecting the power connector.

External power supply plug fits into this connector in only one orientation. Properly press down power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

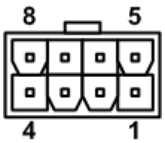
The CN24 is a 24-pin ATX power connector. Its pin assignments are given in table below.

Pin	Signal	Pin	Signal
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWR OK	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND



The ATX2 is an 8-pin +12V ATX power connector for connecting CPU core voltage.

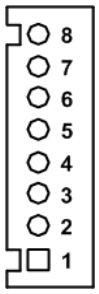
Pin	Signal	Pin	Signal
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V



2.4.15 Internal Power Connector (CN25)

The internal power interface is available through this connector.

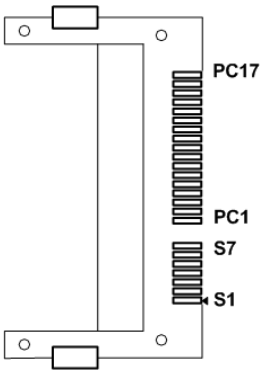
Pin	Signal
1	GND
2	GND
3	5VSB
4	3.3V
5	-5V
6	+5V
7	-12V
8	+12V



2.4.16 CFast™ Socket (CF1)

The board is equipped with a CFast™ socket to support CFast™ card which is based on the Serial ATA bus. The socket is specially designed to avoid incorrect installation of CFast™ card. When installing or removing CFast™ card, please make sure system power is off. The CFast™ card by default identifies itself as C: or D: drive in your PC system.

Pin	Signal	Pin	Signal
S1	GND	PC1	NC
S2	TX+	PC2	GND
S3	TX-	PC3	NC
S4	GND	PC4	NC
S5	RX+	PC5	NC
S6	RX-	PC6	NC
S7	GND	PC7	GND
		PC8	NC
		PC9	NC
		PC10	NC
		PC11	NC
		PC12	NC
		PC13	3.3V
		PC14	3.3V
		PC15	GND
		PC16	GND
		PC17	NC



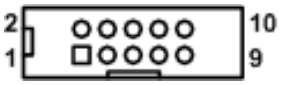
2.4.17 COM Connectors (COM2~6)

Each connector is a 2x5-pin 2.0 pitch box header. Only COM2 supports RS-232/422/485 communication mode. If you need COM2 to support RS-422 or RS-485 mode, please refer to section 5.4.

COM2:

Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	DSR	No use	No use
3	RXD	TX+	Data+
4	RTS	No use	No use
5	TXD	RX+	No use
6	CTS	No use	No use
7	DTR	RX-	No use
8	RI	No use	No use
9	GND	No use	No use
10	No use	No use	No use

COM2~COM6



COM3~COM6:

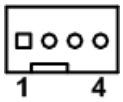
Pin	Signal
1	Data Carrier Detect (DCD)
2	Data Set Ready (DSR)
3	Receive Data (RXD)
4	Request to Send (RTS)
5	Transmit Data (TXD)
6	Clear to Send (CTS)
7	Data Terminal Ready (DTR)
8	Ring Indicator (RI)
9	Ground (GND)
10	NC

2.4.18 Fan Connectors (FAN1 and FAN2)

Fans are always needed for cooling down CPU and system temperature. The board has two fan connectors. You can find fan speed on BIOS Setup Utility if CPU fan is installed. For further information, see BIOS Setup Utility: Advanced\HW Monitor\PC Health Status (refer to section 5.4).

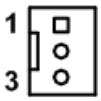
The FAN1 is a CPU fan interface, see table below.

Pin	Signal
1	GND
2	+12V level
3	Rotation detection
4	Speed control



The FAN2 is a system fan interface, see table below.

Pin	Signal
1	GND
2	+12V level
3	Sensor



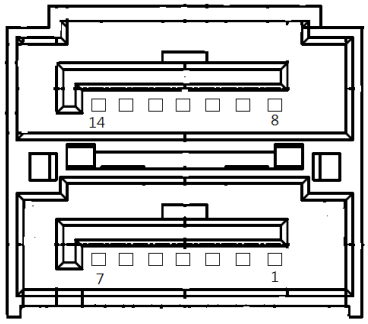
2.4.19 Serial ATA Connectors (SATA1~3)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are for high-speed SATA interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives.

This board has five SATA 3.0 ports with 6Gb/s performance.

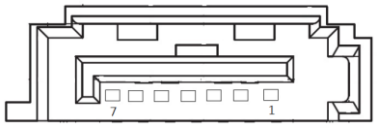
Pin	Signal
1	GND
2	SATA1_TX+
3	SATA1_TX-
4	GND
5	SATA1_RX-
6	SATA1_RX+
7	GND
8	GND
9	SATA2_TX+
10	SATA2_TX-
11	GND
12	SATA2_RX-
13	SATA2_RX+
14	GND

SATA1, SATA2



Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

SATA3



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Chapter 3
Hardware Installation

Before installing the processor, please access Intel® website for more detail information of Processor Integration Video (LGA1150)**:**

http://www.intel.com/support/tw/processors/sb/CS-030860.htm .

3.1 Installing the Processor

The LGA1150 processor socket comes with a cover to protect the processor. Please install the processor into the CPU socket step by step as below:

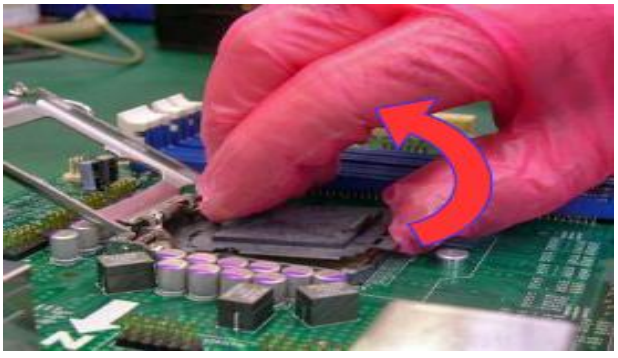
Step1 Opening the socket:

- Disengage load lever by releasing down and out on the hook. This will clear retention tab.
- Rotate load lever to open position at approximately 135°.
- Rotate load plate to open position at approximately 150°.

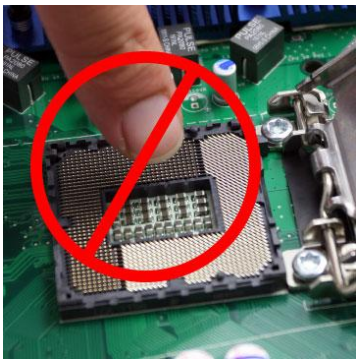
Note: ***Apply pressure to corner with right-hand thumb when opening or closing load lever - otherwise lever will bounce back (as a mouse trap) causing bent contacts.***

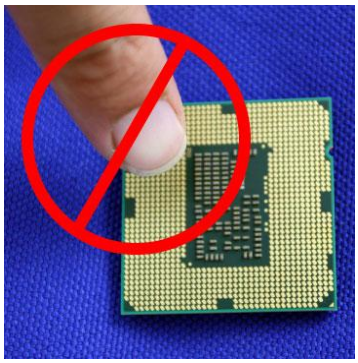
Step2 Removing the socket protective cover:

- Place thumb against the front edge of the protective cover and rest index finger on the rear grip to maintain control of the cover.
- Lift the front edge of the protective cover to disengage from the socket. Keep control of the cover by holding the rear grip with index finger.
- Lift protective cover away from the socket, being careful not to touch the electrical contacts.



Note: ***Vertical removal is NOT recommended, as it requires higher force and can lead to socket contact damage.***

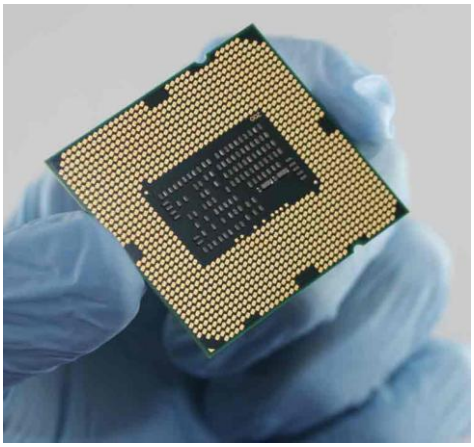




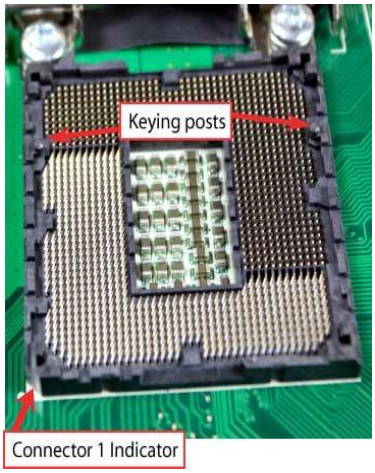
Caution: ***Never touch fragile socket contacts to avoid damage and do not touch processor sensitive contacts at any time during installation.***

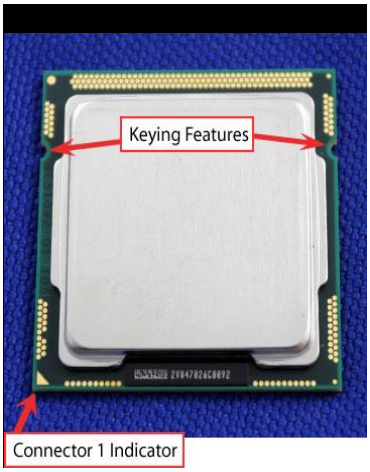
Step3 Processor installation:

- Lift processor package from shipping media by grasping the substrate edges.



- Scan the processor package gold pads for any presence of foreign material. If necessary, the gold pads can be wiped clean with a soft lint-free cloth and isopropyl alcohol.
- Locate connection 1 indicator on the processor which aligns with connection 1 indicator chamfer on the socket, and notice processor keying features that line up with posts along socket walls.

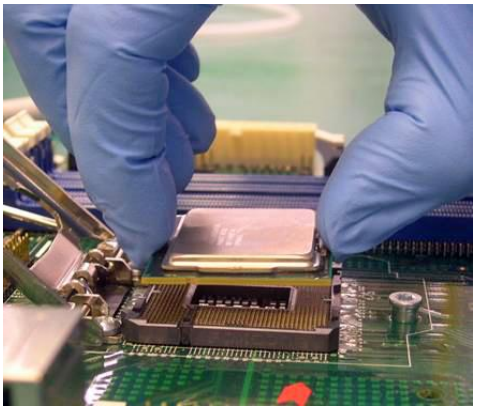




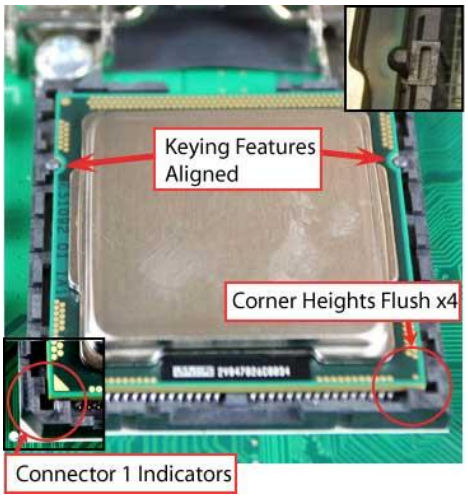
- Grasp the processor with thumb and index finger along the top and bottom edges. (Do not touch the orientation notches.) The socket will have cutouts for your fingers to fit into (see image below).
- Carefully place the processor into the socket body vertically (see image below).

Note: ***Tilting or roughly shifting it into place can damage socket contacts.***

Caution: ***Do not use a vacuum pen for installation.***

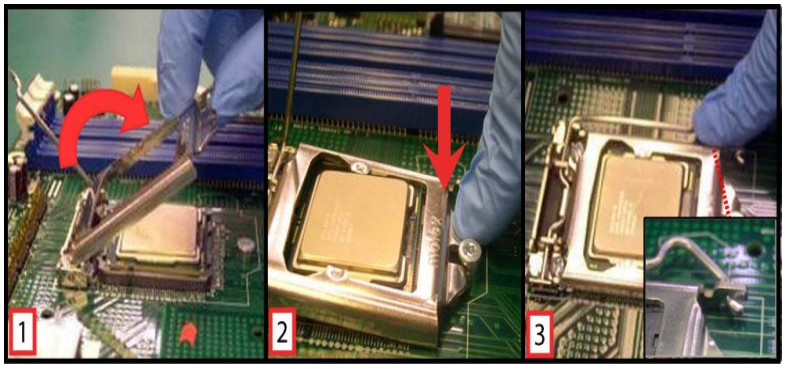


- Verify that package is within the socket body and properly connected to orientation keys.



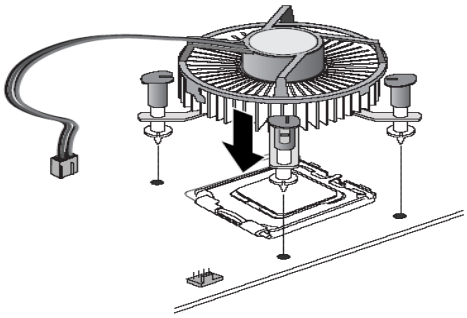
- Close the socket (see image below):

1. Gently lower the load plate.
2. Make sure load plate's front edge slides under the shoulder screw cap as the lever is lowered.
3. Latch the lever under the top plate's corner tab, being cautious not to damage the motherboard with the tip of the lever.

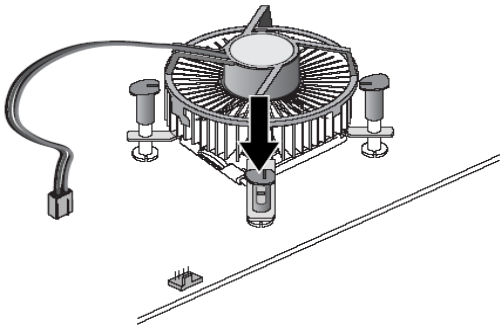


Step4 Fan heatsink handling:

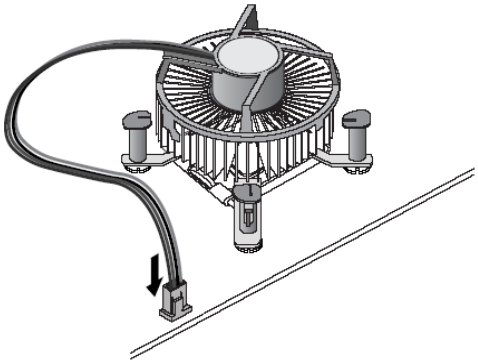
1. Orientate the CPU cooling fan to fixing holes on the board.



2. Screw the CPU cooling fan onto the board.



3. Make sure the CPU fan is plugged to the CPU fan connector.

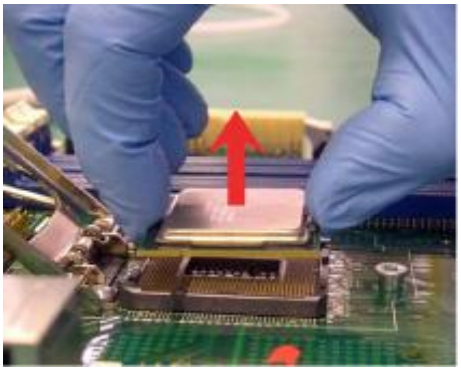


Step5 Removing the processor:

- Open the socket:

  1. Disengage the load lever.
  2. Open the load plate

- Remove the Processor package, holding along the top and bottom edges, or by using a vacuum pen.
- Maintain Processor horizontal and remove Processor with a vertical motion to avoid damaging the socket contacts.

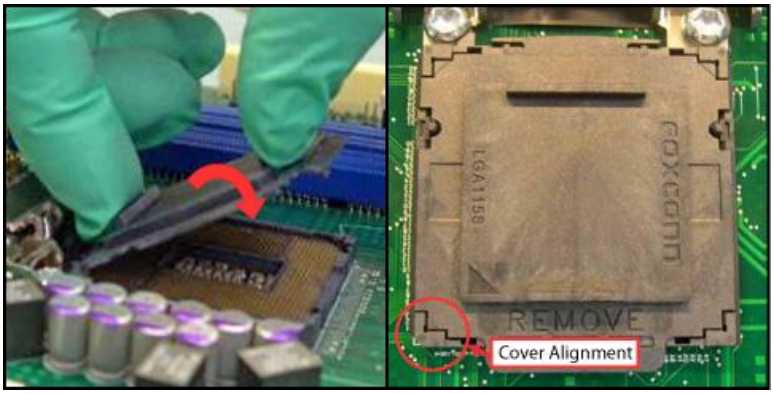


- Place the processor in a specially designed tray or ESD retainer for storage. Do not place directly on table resting on gold lands
- Assemble LGA1150 socket protective cover:

1. Hold protective cover at 45 degree angle to the LGA1150 Socket.
2. Carefully lower protective cover on hinge side first, to contact with the outside wall of the LGA1150 Socket:
3. Engage protective cover retention features to outside of LGA1150 Socket, and align 2 cover corners to socket corners (This step is critical to avoid Bent Contact Damage!).
4. Lower protective cover to attach to the LGA1150 Socket on Shoulder screw side.

- Perform Visual and Tactile verification that protective cover is properly seated in the LGA1150 Socket:

  Hold cover and move gently “side by side” to feel the play within the cover and the LGA1150 Socket.



- Close the socket load plate and engage the load lever (see image below).

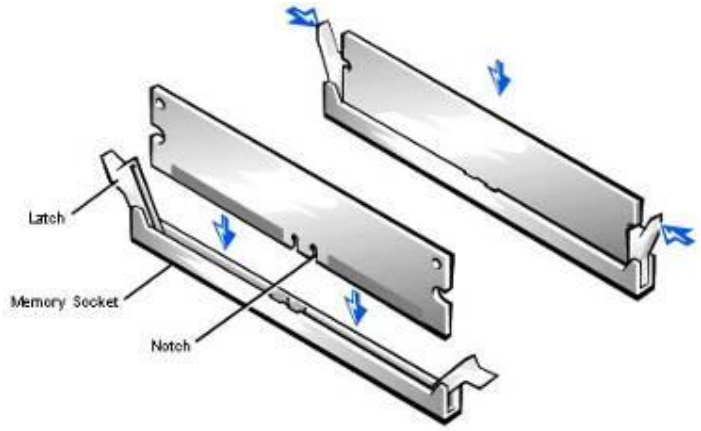
3.2 Installing the Memory

The board supports four 240-pin DDR3 DIMM memory sockets with maximum memory capacity up to 32GB.

Note: ***A DDR3 module has the same physical dimensions as a DDR2 DIMM but is notched differently to prevent installation on a DDR2 DIMM socket.***

Please follow steps below to install the memory modules:

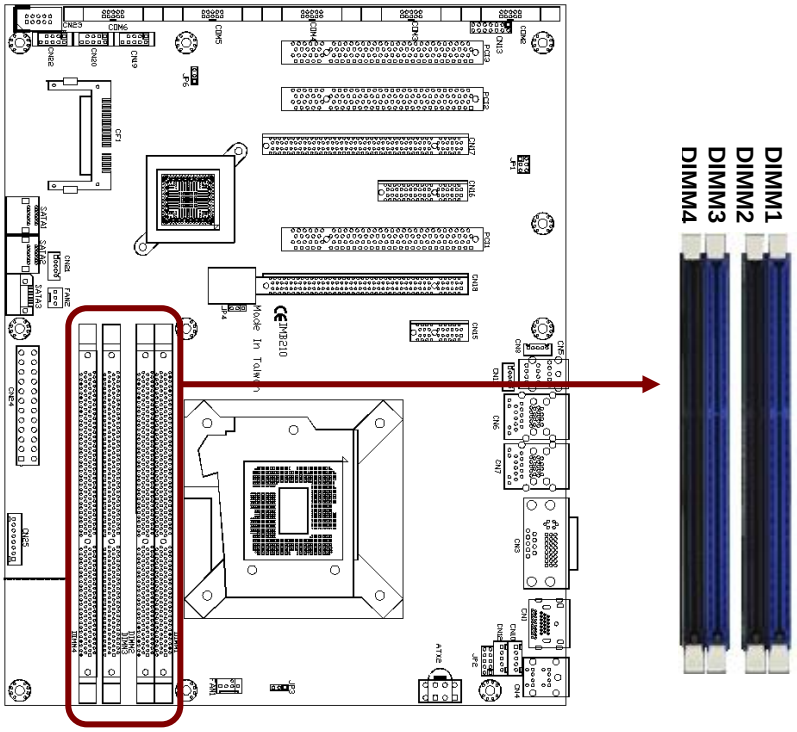
- Push down latches on each side of the DIMM socket.
- Align the memory module with the socket that notches of memory module must match the socket keys for a correct installation.
- Install the memory module into the socket and push it firmly down until it is fully seated. The socket latches are levered upwards and clipped on to the edges of the DIMM.
- Install any remaining DIMM modules.



3.2.1 Dual Channel Memory Configuration

This motherboard provides four DDR3 memory sockets and support Dual Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory enabling Dual Channel memory sockets are divided into two channels and each channel has two memory sockets as follows:

- Channel 0: DIMM1, DIMM2
- Channel 1: DIMM3, DIMM4



Due to CPU limitations, read the following guidelines before installing the memory in Dual Channel mode.

1. Dual Channel mode cannot be enabled if only one DDR3 memory module is installed.
2. When enabling Dual Channel mode with two or four memory modules, it is recommended that memory of the same capacity, brand, speed, and chips are used for optimum performance. When enabling Dual Channel mode with two memory modules, be sure to install them in DIMM2 and DIMM4 sockets.

Chapter 4
Hardware Description

4.1 Microprocessors

The IMB210 Series supports Intel® Xeon® E3/ Core™ i7/ i5/ i3/ Pentium®/ Celeron® processors, which enable your system to operate under Windows® 7, Windows® 8 and Linux environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

4.2 BIOS

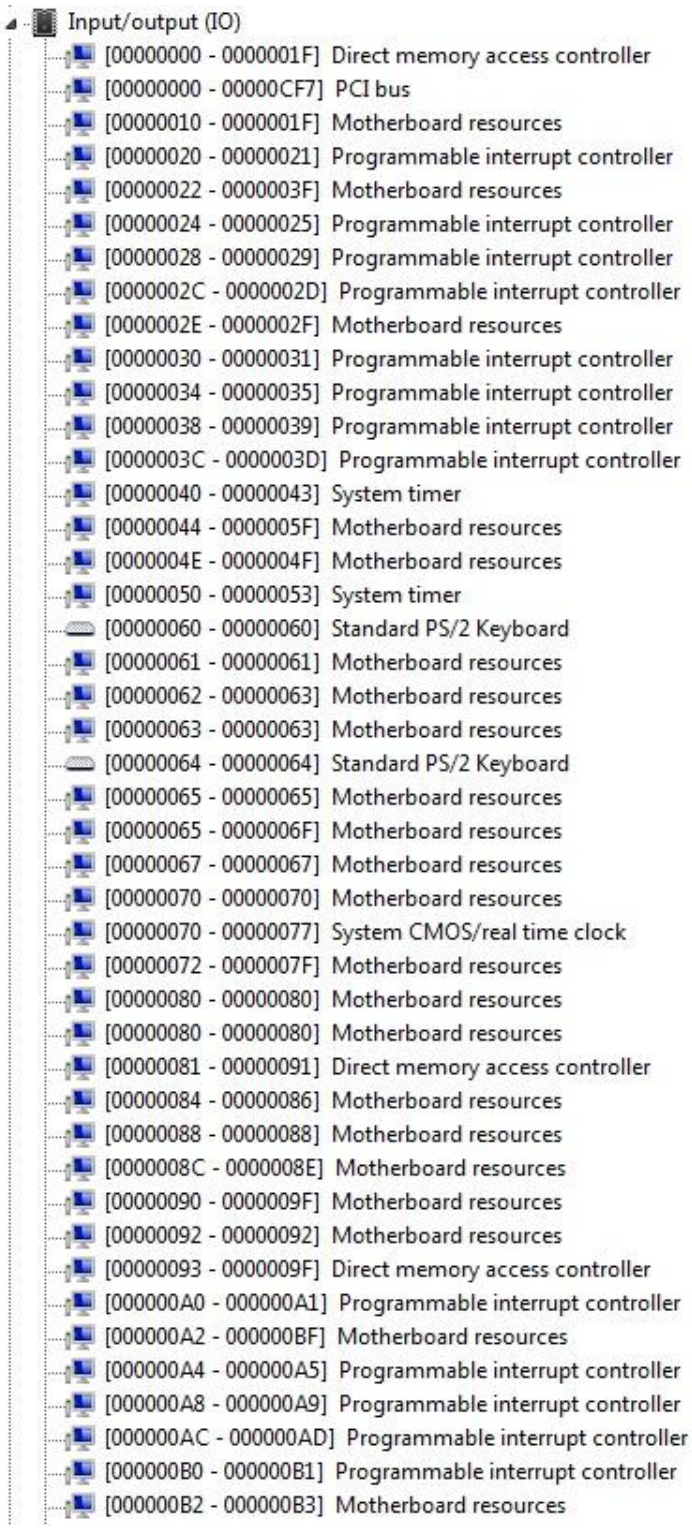
The IMB210 Series uses AMI Plug and Play BIOS with a single 64Mbit SPI Flash.

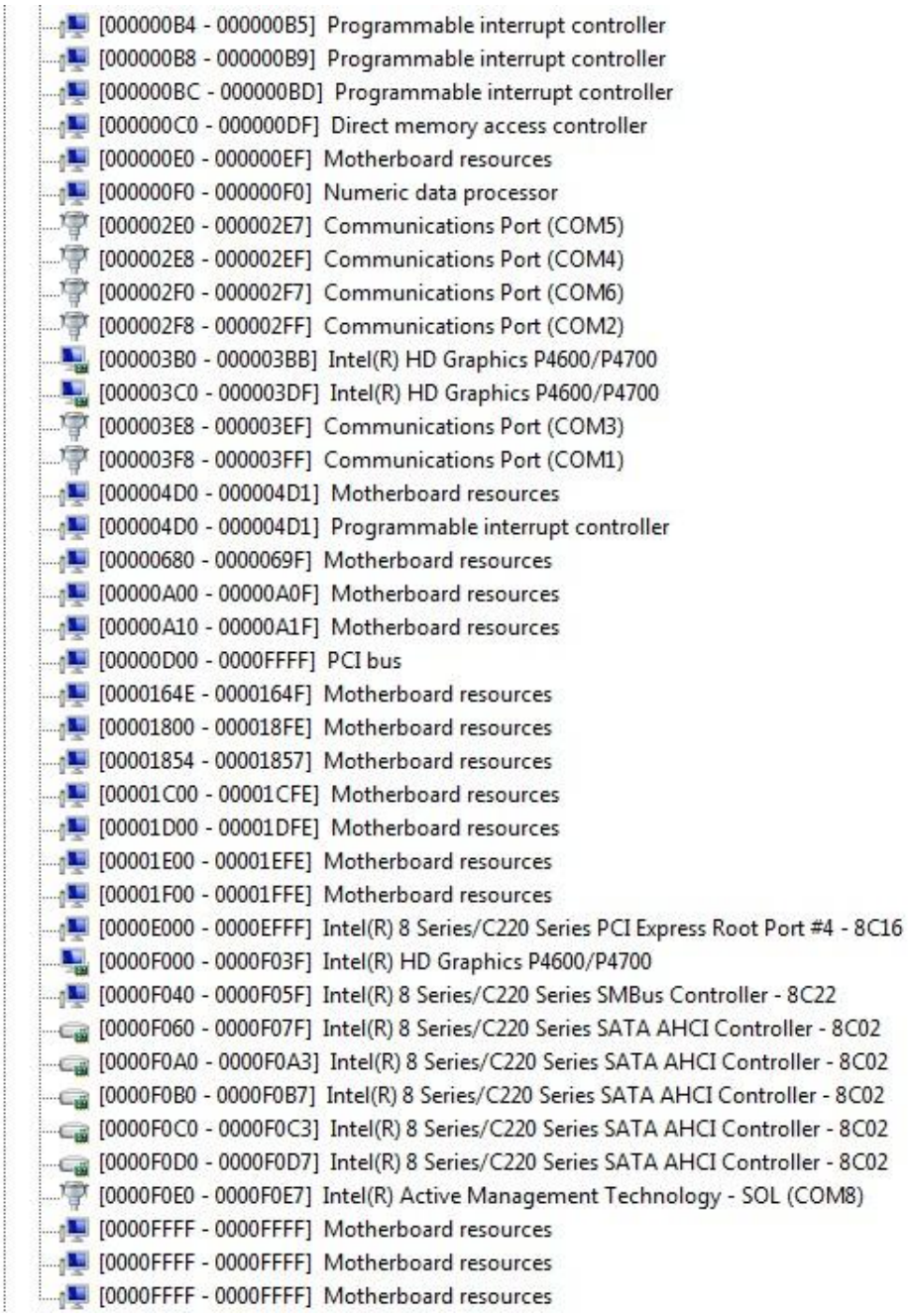
4.3 System Memory

The IMB210 Series supports four 240-pin DDR3 DIMM sockets for a maximum memory of 32GB DDR3 SDRAMs. The memory module comes in sizes of 1GB, 2GB, 4GB and 8GB.

4.4 I/O Port Address Map

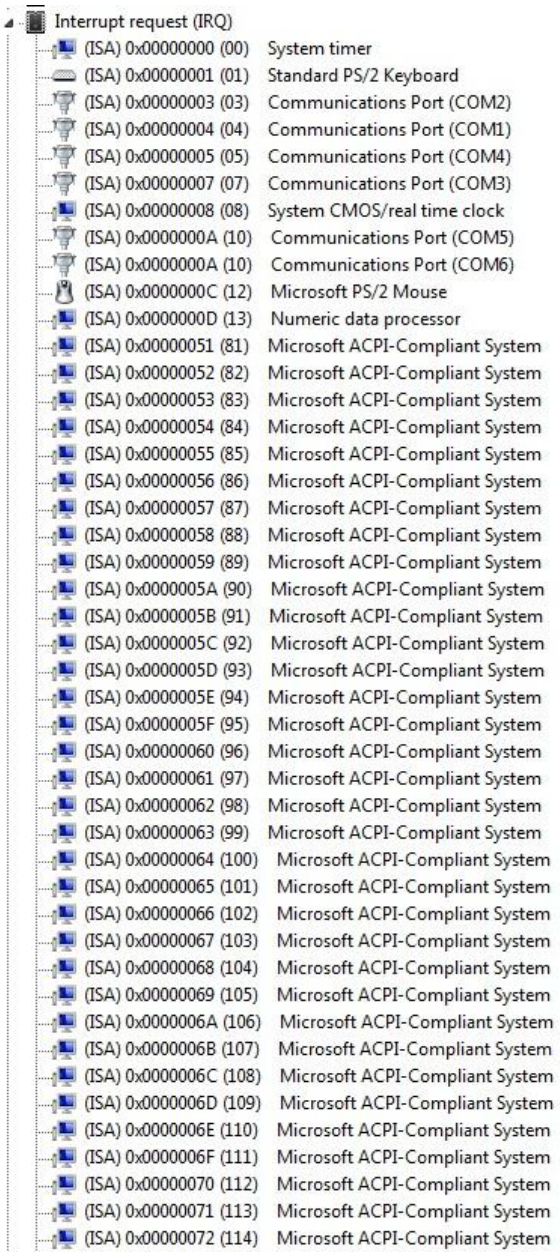
The Intel® Xeon® E3/ Core™ i7/ i5/ i3/ Pentium®/ Celeron® processors communicate via I/O ports. Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.

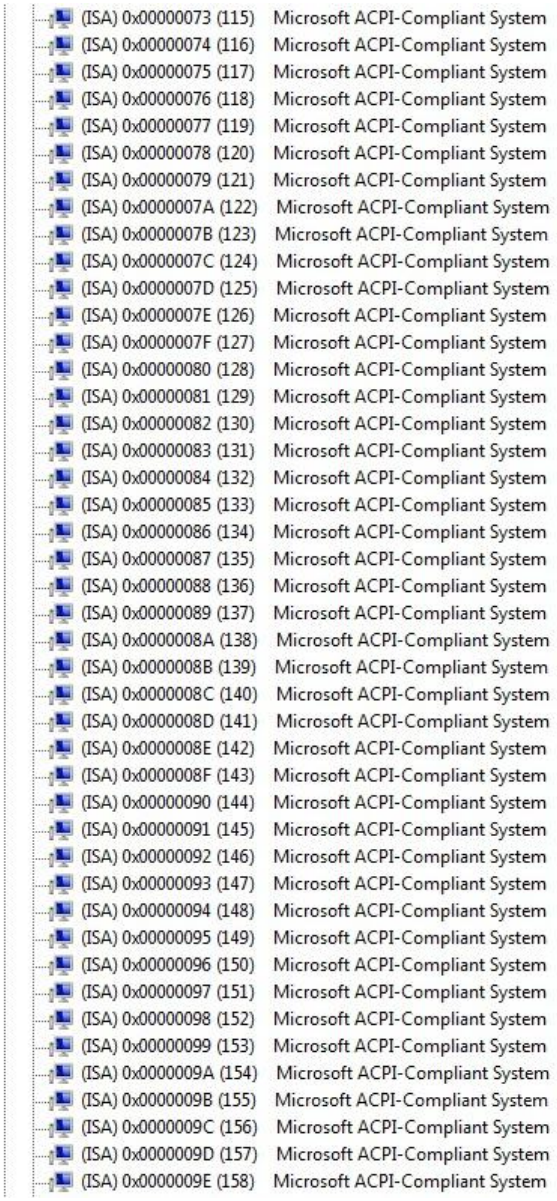

Input/output (IO)
[00000000 - 0000001F] Direct memory access controller
[00000000 - 00000CF7] PCI bus
[00000010 - 0000001F] Motherboard resources
[00000020 - 00000021] Programmable interrupt controller
[00000022 - 0000003F] Motherboard resources
[00000024 - 00000025] Programmable interrupt controller
[00000028 - 00000029] Programmable interrupt controller
[0000002C - 0000002D] Programmable interrupt controller
[0000002E - 0000002F] Motherboard resources
[00000030 - 00000031] Programmable interrupt controller
[00000034 - 00000035] Programmable interrupt controller
[00000038 - 00000039] Programmable interrupt controller
[0000003C - 0000003D] Programmable interrupt controller
[00000040 - 00000043] System timer
[00000044 - 0000005F] Motherboard resources
[0000004E - 0000004F] Motherboard resources
[00000050 - 00000053] System timer
[00000060 - 00000060] Standard PS/2 Keyboard
[00000061 - 00000061] Motherboard resources
[00000062 - 00000063] Motherboard resources
[00000063 - 00000063] Motherboard resources
[00000064 - 00000064] Standard PS/2 Keyboard
[00000065 - 00000065] Motherboard resources
[00000065 - 0000006F] Motherboard resources
[00000067 - 00000067] Motherboard resources
[00000070 - 00000070] Motherboard resources
[00000070 - 00000077] System CMOS/real time clock
[00000072 - 0000007F] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000081 - 00000091] Direct memory access controller
[00000084 - 00000086] Motherboard resources
[00000088 - 00000088] Motherboard resources
[0000008C - 0000008E] Motherboard resources
[00000090 - 0000009F] Motherboard resources
[00000092 - 00000092] Motherboard resources
[00000093 - 0000009F] Direct memory access controller
[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000A4 - 000000A5] Programmable interrupt controller
[000000A8 - 000000A9] Programmable interrupt controller
[000000AC - 000000AD] Programmable interrupt controller
[000000B0 - 000000B1] Programmable interrupt controller
[000000B2 - 000000B3] Motherboard resources

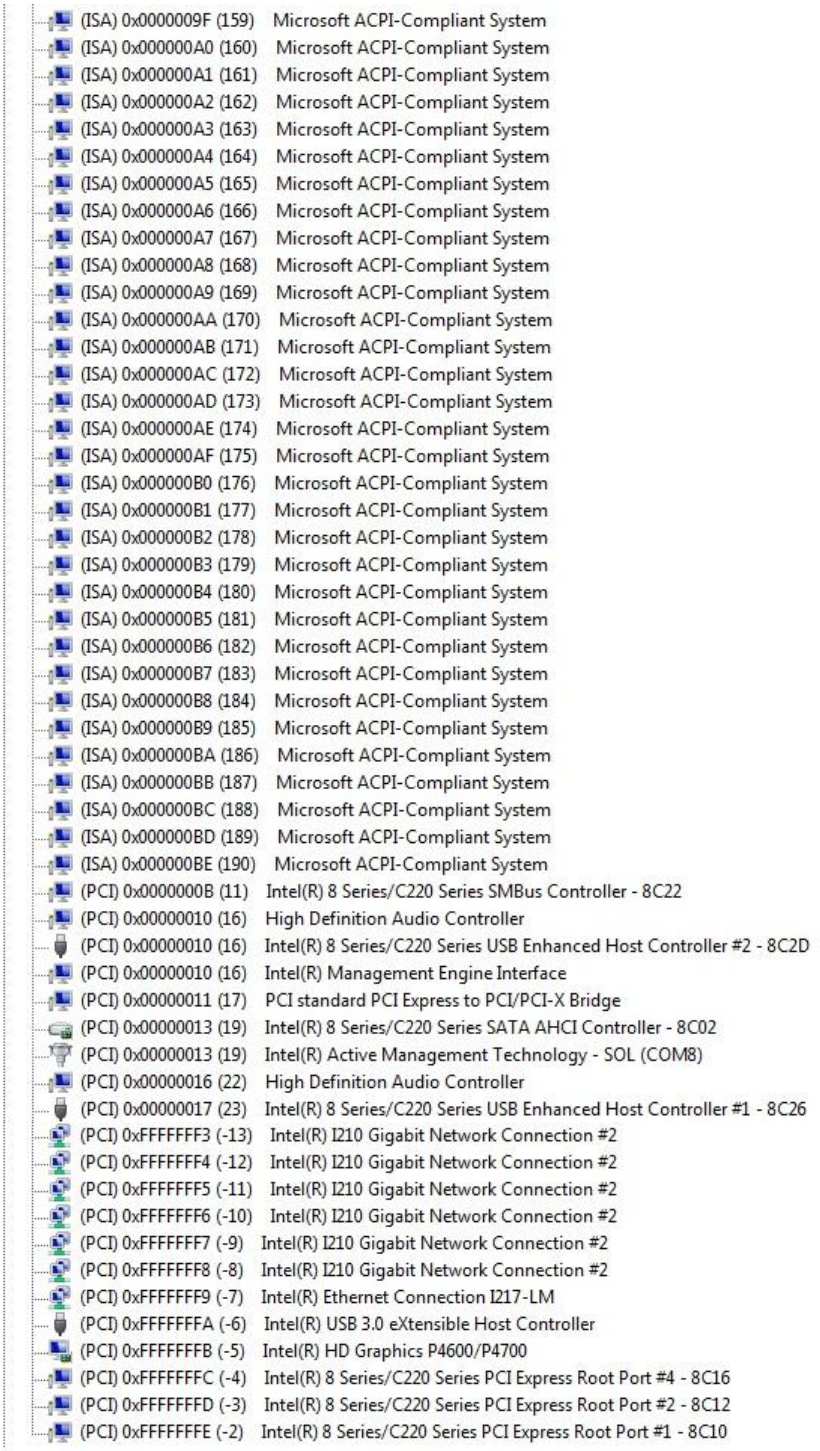

[000000B4 - 000000B5] Programmable interrupt controller
[000000B8 - 000000B9] Programmable interrupt controller
[000000BC - 000000BD] Programmable interrupt controller
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[000000F0 - 000000F0] Numeric data processor
[000002E0 - 000002E7] Communications Port (COM5)
[000002E8 - 000002EF] Communications Port (COM4)
[000002F0 - 000002F7] Communications Port (COM6)
[000002F8 - 000002FF] Communications Port (COM2)
[000003B0 - 000003BB] Intel(R) HD Graphics P4600/P4700
[000003C0 - 000003DF] Intel(R) HD Graphics P4600/P4700
[000003E8 - 000003EF] Communications Port (COM3)
[000003F8 - 000003FF] Communications Port (COM1)
[000004D0 - 000004D1] Motherboard resources
[000004D0 - 000004D1] Programmable interrupt controller
[00000680 - 0000069F] Motherboard resources
[00000A00 - 00000A0F] Motherboard resources
[00000A10 - 00000A1F] Motherboard resources
[00000D00 - 0000FFFF] PCI bus
[0000164E - 0000164F] Motherboard resources
[00001800 - 000018FE] Motherboard resources
[00001854 - 00001857] Motherboard resources
[00001C00 - 00001CFE] Motherboard resources
[00001D00 - 00001DFE] Motherboard resources
[00001E00 - 00001EFE] Motherboard resources
[00001F00 - 00001FFE] Motherboard resources
[0000E000 - 0000EFFF] Intel(R) 8 Series/C220 Series PCI Express Root Port #4 - 8C16
[0000F000 - 0000F03F] Intel(R) HD Graphics P4600/P4700
[0000F040 - 0000F05F] Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
[0000F060 - 0000F07F] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
[0000F0A0 - 0000F0A3] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
[0000F0B0 - 0000F0B7] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
[0000F0C0 - 0000F0C3] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
[0000F0D0 - 0000F0D7] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
[0000F0E0 - 0000F0E7] Intel(R) Active Management Technology - SOL (COM8)
[0000FFFF - 0000FFFF] Motherboard resources
[0000FFFF - 0000FFFF] Motherboard resources
[0000FFFF - 0000FFFF] Motherboard resources

4.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

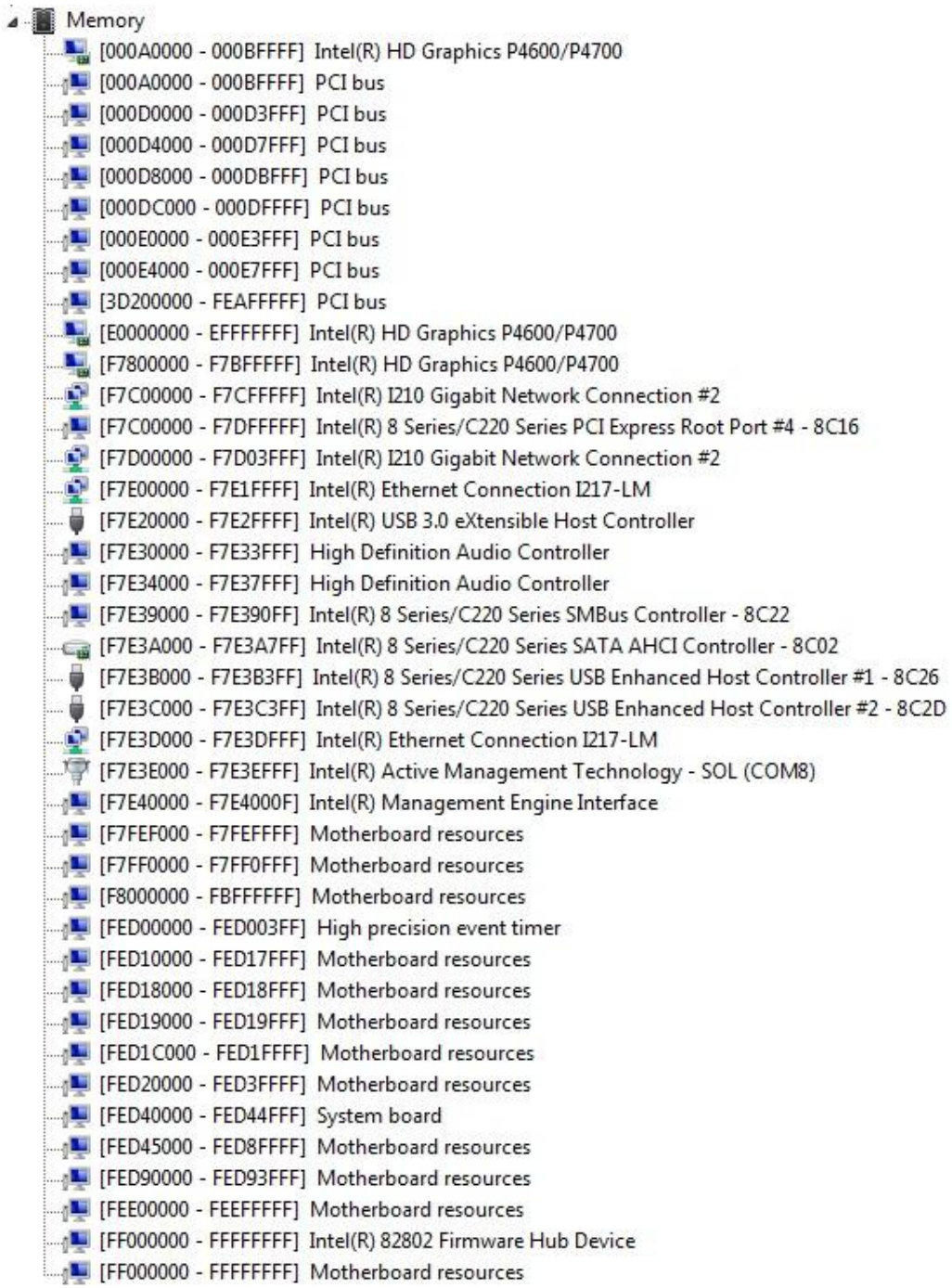

Interrupt request (IRQ)
(ISA) 0x00000000 (00) System timer
(ISA) 0x00000001 (01) Standard PS/2 Keyboard
(ISA) 0x00000003 (03) Communications Port (COM2)
(ISA) 0x00000004 (04) Communications Port (COM1)
(ISA) 0x00000005 (05) Communications Port (COM4)
(ISA) 0x00000007 (07) Communications Port (COM3)
(ISA) 0x00000008 (08) System CMOS/real time clock
(ISA) 0x0000000A (10) Communications Port (COM5)
(ISA) 0x0000000A (10) Communications Port (COM6)
(ISA) 0x0000000C (12) Microsoft PS/2 Mouse
(ISA) 0x0000000D (13) Numeric data processor
(ISA) 0x00000051 (81) Microsoft ACPI-Compliant System
(ISA) 0x00000052 (82) Microsoft ACPI-Compliant System
(ISA) 0x00000053 (83) Microsoft ACPI-Compliant System
(ISA) 0x00000054 (84) Microsoft ACPI-Compliant System
(ISA) 0x00000055 (85) Microsoft ACPI-Compliant System
(ISA) 0x00000056 (86) Microsoft ACPI-Compliant System
(ISA) 0x00000057 (87) Microsoft ACPI-Compliant System
(ISA) 0x00000058 (88) Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89) Microsoft ACPI-Compliant System
(ISA) 0x0000005A (90) Microsoft ACPI-Compliant System
(ISA) 0x0000005B (91) Microsoft ACPI-Compliant System
(ISA) 0x0000005C (92) Microsoft ACPI-Compliant System
(ISA) 0x0000005D (93) Microsoft ACPI-Compliant System
(ISA) 0x0000005E (94) Microsoft ACPI-Compliant System
(ISA) 0x0000005F (95) Microsoft ACPI-Compliant System
(ISA) 0x00000060 (96) Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97) Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98) Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99) Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100) Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101) Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102) Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103) Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104) Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105) Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106) Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107) Microsoft ACPI-Compliant System
(ISA) 0x0000006C (108) Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109) Microsoft ACPI-Compliant System
(ISA) 0x0000006E (110) Microsoft ACPI-Compliant System
(ISA) 0x0000006F (111) Microsoft ACPI-Compliant System
(ISA) 0x00000070 (112) Microsoft ACPI-Compliant System
(ISA) 0x00000071 (113) Microsoft ACPI-Compliant System
(ISA) 0x00000072 (114) Microsoft ACPI-Compliant System


(ISA) 0x00000073 (115) Microsoft ACPI-Compliant System
(ISA) 0x00000074 (116) Microsoft ACPI-Compliant System
(ISA) 0x00000075 (117) Microsoft ACPI-Compliant System
(ISA) 0x00000076 (118) Microsoft ACPI-Compliant System
(ISA) 0x00000077 (119) Microsoft ACPI-Compliant System
(ISA) 0x00000078 (120) Microsoft ACPI-Compliant System
(ISA) 0x00000079 (121) Microsoft ACPI-Compliant System
(ISA) 0x0000007A (122) Microsoft ACPI-Compliant System
(ISA) 0x0000007B (123) Microsoft ACPI-Compliant System
(ISA) 0x0000007C (124) Microsoft ACPI-Compliant System
(ISA) 0x0000007D (125) Microsoft ACPI-Compliant System
(ISA) 0x0000007E (126) Microsoft ACPI-Compliant System
(ISA) 0x0000007F (127) Microsoft ACPI-Compliant System
(ISA) 0x00000080 (128) Microsoft ACPI-Compliant System
(ISA) 0x00000081 (129) Microsoft ACPI-Compliant System
(ISA) 0x00000082 (130) Microsoft ACPI-Compliant System
(ISA) 0x00000083 (131) Microsoft ACPI-Compliant System
(ISA) 0x00000084 (132) Microsoft ACPI-Compliant System
(ISA) 0x00000085 (133) Microsoft ACPI-Compliant System
(ISA) 0x00000086 (134) Microsoft ACPI-Compliant System
(ISA) 0x00000087 (135) Microsoft ACPI-Compliant System
(ISA) 0x00000088 (136) Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137) Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138) Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139) Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140) Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141) Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142) Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143) Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144) Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145) Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146) Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147) Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148) Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149) Microsoft ACPI-Compliant System
(ISA) 0x00000096 (150) Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151) Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152) Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153) Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154) Microsoft ACPI-Compliant System
(ISA) 0x0000009B (155) Microsoft ACPI-Compliant System
(ISA) 0x0000009C (156) Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157) Microsoft ACPI-Compliant System
(ISA) 0x0000009E (158) Microsoft ACPI-Compliant System


(ISA) 0x0000009F (159) Microsoft ACPI-Compliant System
(ISA) 0x000000A0 (160) Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161) Microsoft ACPI-Compliant System
(ISA) 0x000000A2 (162) Microsoft ACPI-Compliant System
(ISA) 0x000000A3 (163) Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164) Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165) Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166) Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167) Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168) Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169) Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170) Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171) Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172) Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173) Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174) Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175) Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176) Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177) Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178) Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179) Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180) Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181) Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182) Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183) Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184) Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185) Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186) Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187) Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188) Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189) Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190) Microsoft ACPI-Compliant System
(PCI) 0x0000000B (11) Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
(PCI) 0x00000010 (16) High Definition Audio Controller
(PCI) 0x00000010 (16) Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #2 - 8C2D
(PCI) 0x00000010 (16) Intel(R) Management Engine Interface
(PCI) 0x00000011 (17) PCI standard PCI Express to PCI/PCI-X Bridge
(PCI) 0x00000013 (19) Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
(PCI) 0x00000013 (19) Intel(R) Active Management Technology - SOL (COM8)
(PCI) 0x00000016 (22) High Definition Audio Controller
(PCI) 0x00000017 (23) Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #1 - 8C26
(PCI) 0xFFFFFFF3 (-13) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF4 (-12) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF5 (-11) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF6 (-10) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF7 (-9) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF8 (-8) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF9 (-7) Intel(R) Ethernet Connection I217-LM
(PCI) 0xFFFFFFFA (-6) Intel(R) USB 3.0 eXtensible Host Controller
(PCI) 0xFFFFFFFB (-5) Intel(R) HD Graphics P4600/P4700
(PCI) 0xFFFFFFFC (-4) Intel(R) 8 Series/C220 Series PCI Express Root Port #4 - 8C16
(PCI) 0xFFFFFFFD (-3) Intel(R) 8 Series/C220 Series PCI Express Root Port #2 - 8C12
(PCI) 0xFFFFFFFE (-2) Intel(R) 8 Series/C220 Series PCI Express Root Port #1 - 8C10

4.6 Memory Map

The memory mapping list is shown as follows:


Memory
[000A0000 - 000BFFFF] Intel(R) HD Graphics P4600/P4700
[000A0000 - 000BFFFF] PCI bus
[000D0000 - 000D3FFF] PCI bus
[000D4000 - 000D7FFF] PCI bus
[000D8000 - 000DBFFF] PCI bus
[000DC000 - 000DFFFF] PCI bus
[000E0000 - 000E3FFF] PCI bus
[000E4000 - 000E7FFF] PCI bus
[3D200000 - FEAFFFFF] PCI bus
[E0000000 - EFFFFFFF] Intel(R) HD Graphics P4600/P4700
[F7800000 - F7BFFFFF] Intel(R) HD Graphics P4600/P4700
[F7C00000 - F7CFFFFF] Intel(R) I210 Gigabit Network Connection #2
[F7C00000 - F7DFFFFF] Intel(R) 8 Series/C220 Series PCI Express Root Port #4 - 8C16
[F7D00000 - F7D03FFF] Intel(R) I210 Gigabit Network Connection #2
[F7E00000 - F7E1FFFF] Intel(R) Ethernet Connection I217-LM
[F7E20000 - F7E2FFFF] Intel(R) USB 3.0 eXtensible Host Controller
[F7E30000 - F7E33FFF] High Definition Audio Controller
[F7E34000 - F7E37FFF] High Definition Audio Controller
[F7E39000 - F7E390FF] Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
[F7E3A000 - F7E3A7FF] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
[F7E3B000 - F7E3B3FF] Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #1 - 8C26
[F7E3C000 - F7E3C3FF] Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #2 - 8C2D
[F7E3D000 - F7E3DFFF] Intel(R) Ethernet Connection I217-LM
[F7E3E000 - F7E3EFFF] Intel(R) Active Management Technology - SOL (COM8)
[F7E40000 - F7E4000F] Intel(R) Management Engine Interface
[F7FEF000 - F7FEFFFF] Motherboard resources
[F7FF0000 - F7FF0FFF] Motherboard resources
[F8000000 - FBFFFFFF] Motherboard resources
[FED00000 - FED003FF] High precision event timer
[FED10000 - FED17FFF] Motherboard resources
[FED18000 - FED18FFF] Motherboard resources
[FED19000 - FED19FFF] Motherboard resources
[FED1C000 - FED1FFFF] Motherboard resources
[FED20000 - FED3FFFF] Motherboard resources
[FED40000 - FED44FFF] System board
[FED45000 - FED8FFFF] Motherboard resources
[FED90000 - FED93FFF] Motherboard resources
[FEE00000 - FEEFFFFF] Motherboard resources
[FF000000 - FFFFFFFF] Intel(R) 82802 Firmware Hub Device
[FF000000 - FFFFFFFF] Motherboard resources

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Chapter 5
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

5.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

Note: ***If your computer cannot boot after making and saving system changes with Setup, you can restore BIOS optimal defaults by setting JP6 (see section 2.3.5) .***

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

5.2 Navigation Keys

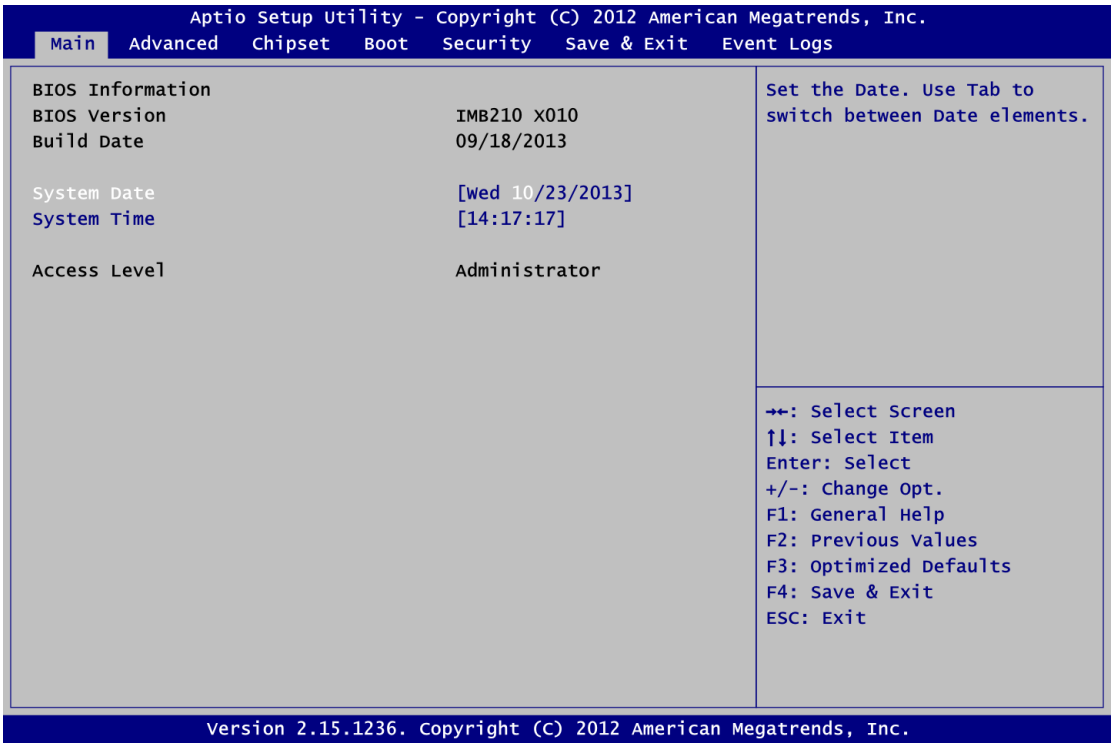
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

Note: ***Some of the navigation keys differ from one screen to another.***

Hot Keys	Description
→← **Left/Right**	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ **Up/Down**	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

5.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



BIOS Information
Display the auto-detected BIOS information.

System Date/Time
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

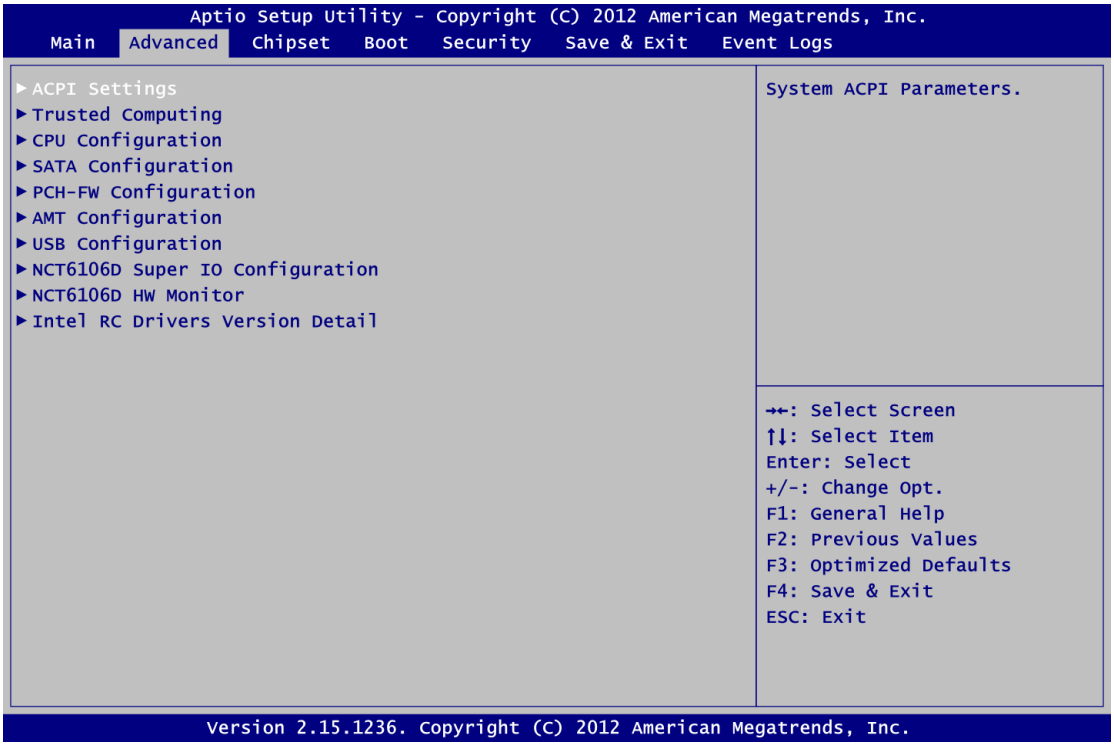
Access Level
Display the access level of current user.

5.4 Advanced Menu

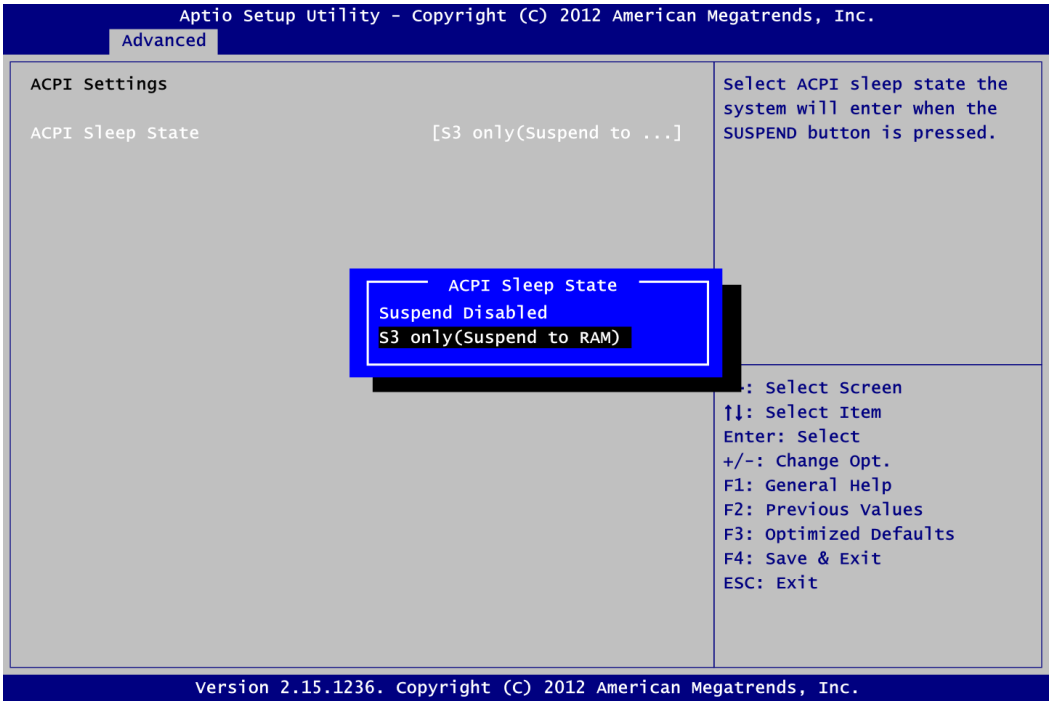
The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ACPI Settings
- Trusted Computing
- CPU Configuration
- SATA Configuration
- PCH-FW Configuration
- AMT Configuration
- USB Configuration
- NCT6106D Super IO Configuration
- NCT6106D HW Monitor
- Intel RC Drivers Version Detail

For items marked with "►", please press <Enter> for more options.

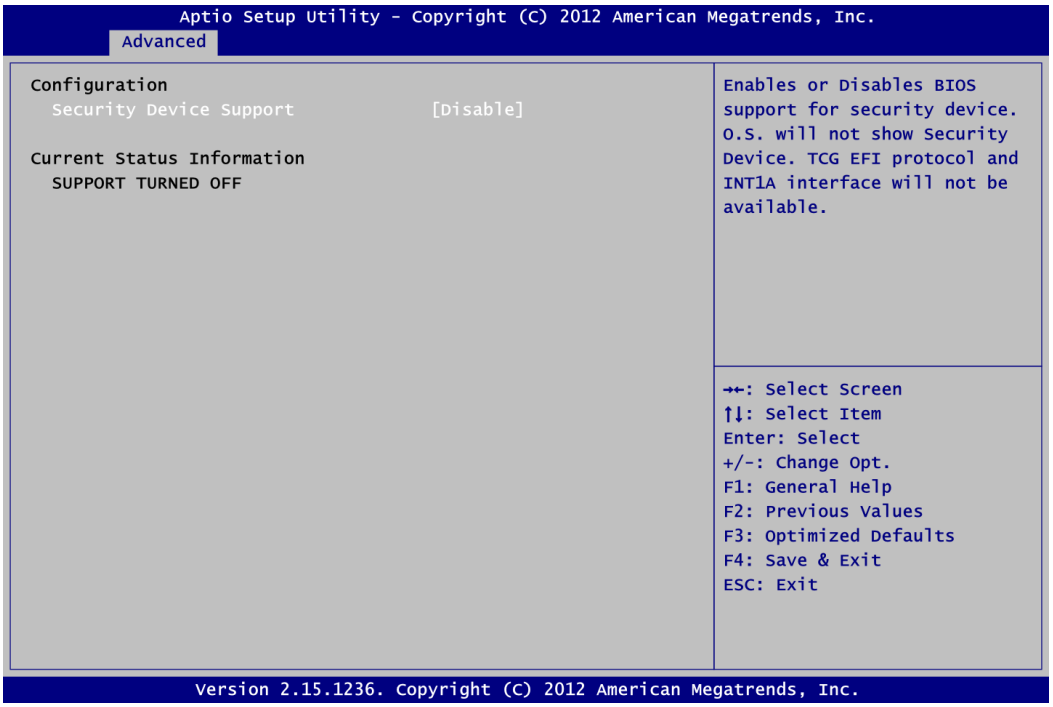


- **ACPI Settings**
  You can use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
ACPI Settings
ACPI Sleep State
[S3 only(Suspend to ...]
Select ACPI sleep state the system will enter when the SUSPEND button is pressed.
ACPI Sleep State
Suspend Disabled
S3 only(Suspend to RAM)
: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

ACPI Sleep State
Select the highest ACPI sleep state the system will enter when the suspend button is pressed. Configuration options are Suspend Disabled and S3 only (Suspend to RAM).

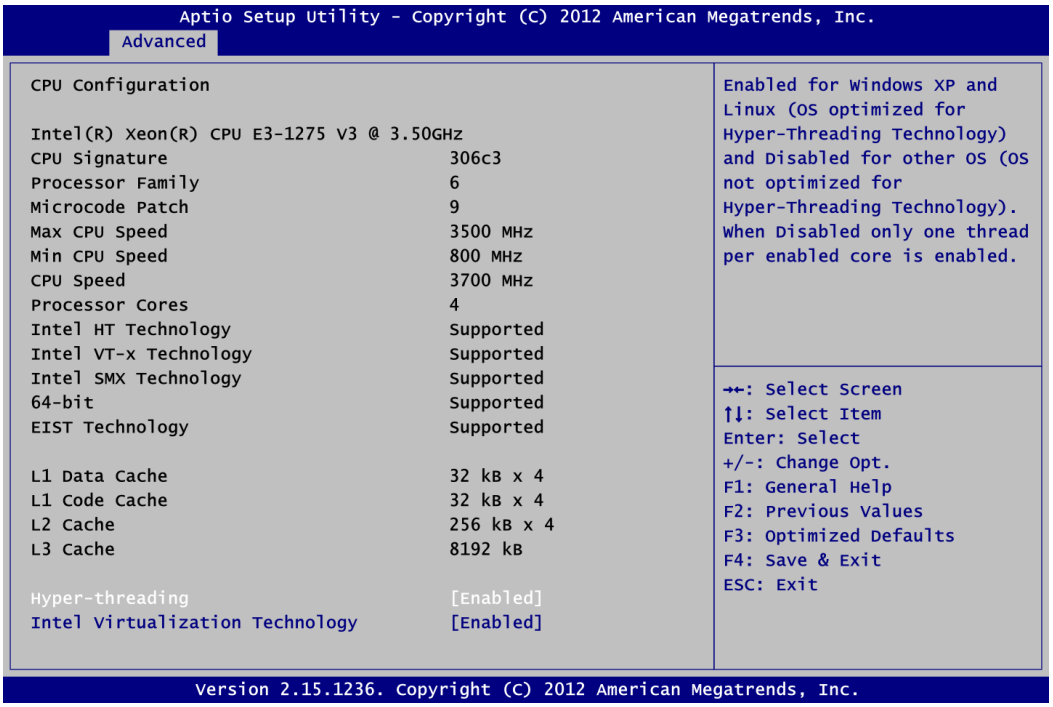
- **Trusted Computing**
  This screen provides function for specifying the TPM settings.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Configuration
Security Device Support [Disable]
Current Status Information
SUPPORT TURNED OFF
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Security Device Support
Enable or disable BIOS support for security device.

Current Status Information
Display current status information.

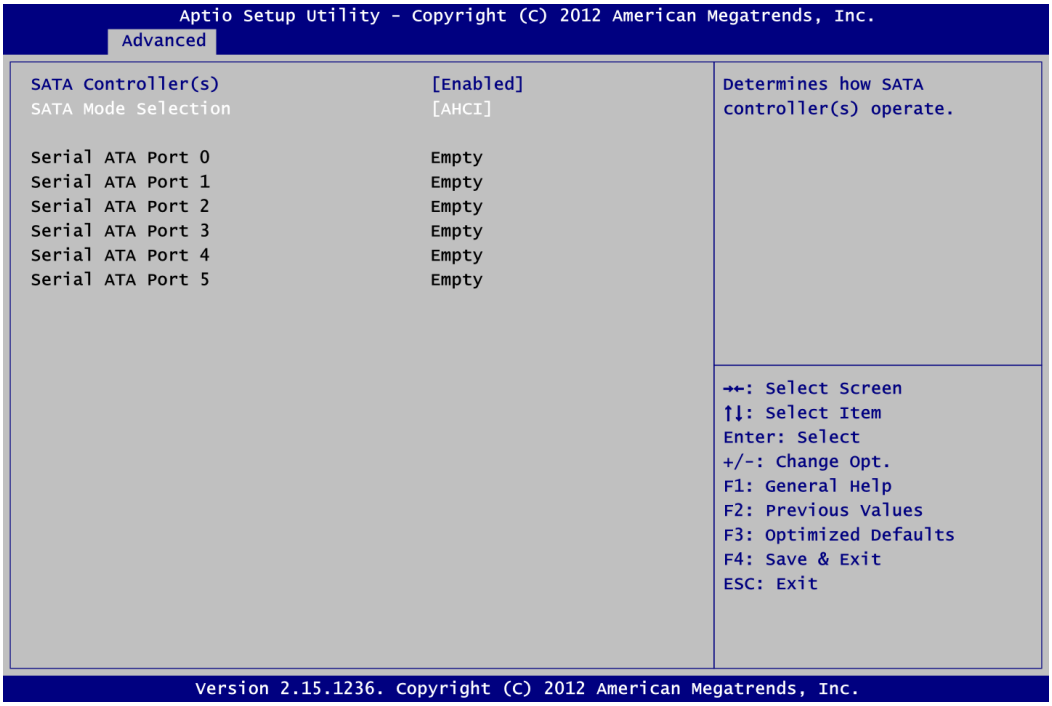
- **CPU Configuration**
  This screen shows the CPU information.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
CPU Configuration
Intel(R) Xeon(R) CPU E3-1275 V3 @ 3.50GHz
CPU Signature 306c3
Processor Family 6
Microcode Patch 9
Max CPU Speed 3500 MHz
Min CPU Speed 800 MHz
CPU Speed 3700 MHz
Processor Cores 4
Intel HT Technology Supported
Intel VT-x Technology Supported
Intel SMX Technology Supported
64-bit Supported
EIST Technology Supported
L1 Data Cache 32 kB x 4
L1 Code Cache 32 kB x 4
L2 Cache 256 kB x 4
L3 Cache 8192 kB
Hyper-threading [Enabled]
Intel Virtualization Technology [Enabled]
Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Hyper-threading
Use this item to enable or disable Hyper-Threading Technology, which makes a single physical processor perform multi-tasking function as two logical ones.

Intel Virtualization Technology
This item allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

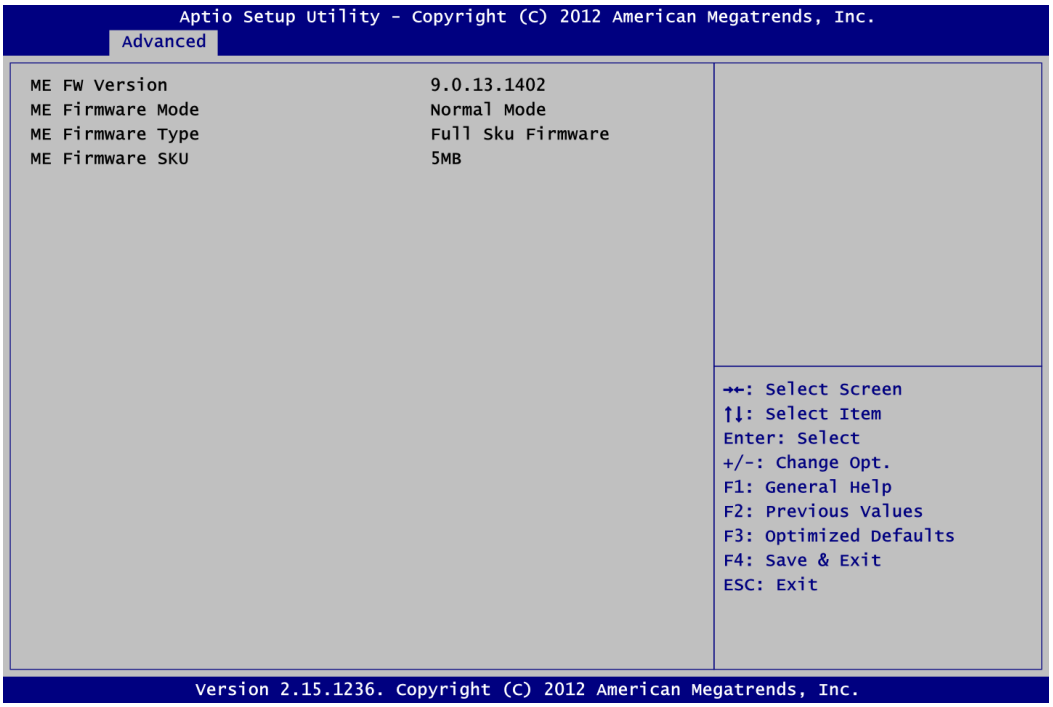
- **SATA Configuration**
  In this Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
SATA Controller(s) [Enabled]
SATA Mode Selection [AHCI]
Serial ATA Port 0 Empty
Serial ATA Port 1 Empty
Serial ATA Port 2 Empty
Serial ATA Port 3 Empty
Serial ATA Port 4 Empty
Serial ATA Port 5 Empty
Determines how SATA controller(s) operate.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

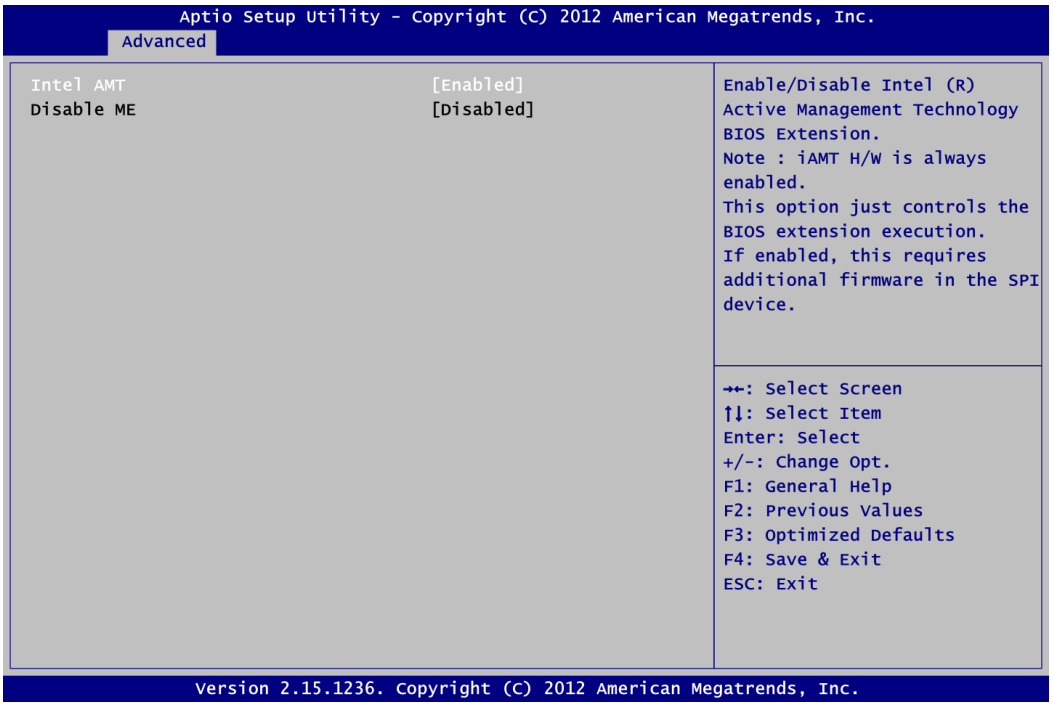
SATA Controller(s)
Use this item to enable or disable SATA device.

SATA Mode Selection
Determine how SATA controller(s) operate. Operation mode options are IDE Mode, AHCI Mode and RAID Mode.

- **PCH-FW Configuration**
  This screen displays ME Firmware information.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
ME FW Version 9.0.13.1402
ME Firmware Mode Normal Mode
ME Firmware Type Full Sku Firmware
ME Firmware SKU 5MB
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

- **AMT Configuration**
  Use this screen to configure AMT parameters.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Intel AMT [Enabled]
Disable ME [Disabled]
Enable/Disable Intel (R) Active Management Technology BIOS Extension.
Note : iAMT H/W is always enabled.
This option just controls the BIOS extension execution.
If enabled, this requires additional firmware in the SPI device.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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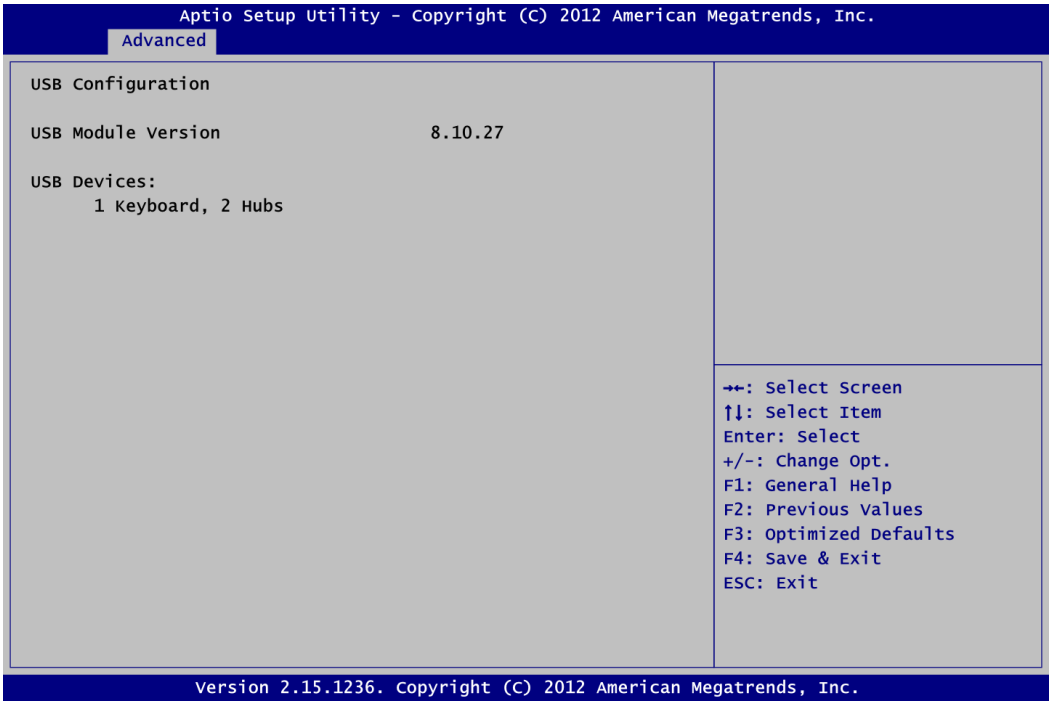
Intel AMT
Enable or disable Intel® Active Management Technology BIOS Extension.

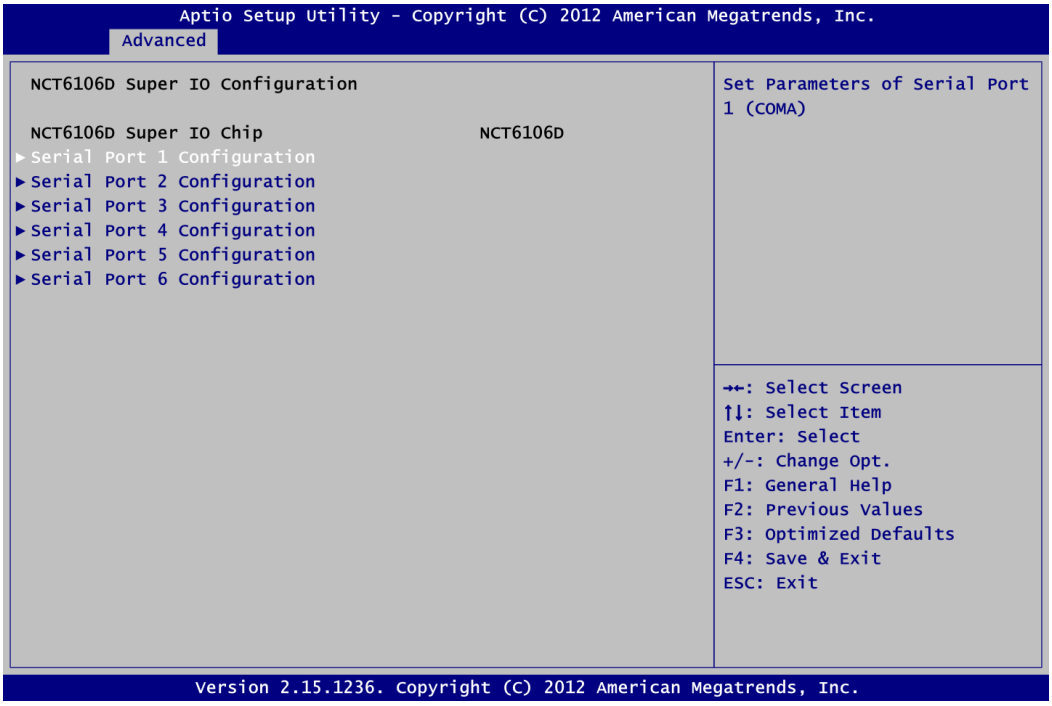
Disable ME
Enable or disable ME functionality.

- **USB Configuration**
  You can use this screen to select options for the USB Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



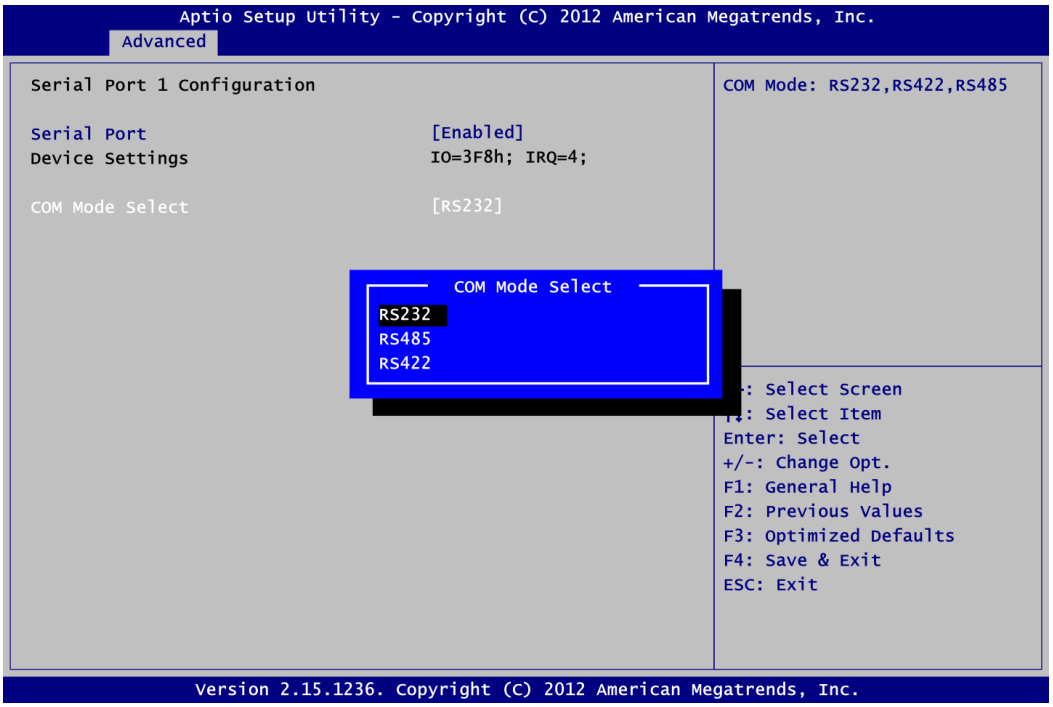
USB Devices
Display all detected USB devices.

- **NCT6106D Super IO Configuration**
  You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
NCT6106D Super IO Configuration
NCT6106D Super IO Chip NCT6106D
► Serial Port 1 Configuration
► Serial Port 2 Configuration
► Serial Port 3 Configuration
► Serial Port 4 Configuration
► Serial Port 5 Configuration
► Serial Port 6 Configuration
Set Parameters of Serial Port 1 (COMA)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Serial Port 1~6 Configuration
Set parameters of serial port 1 to 6.

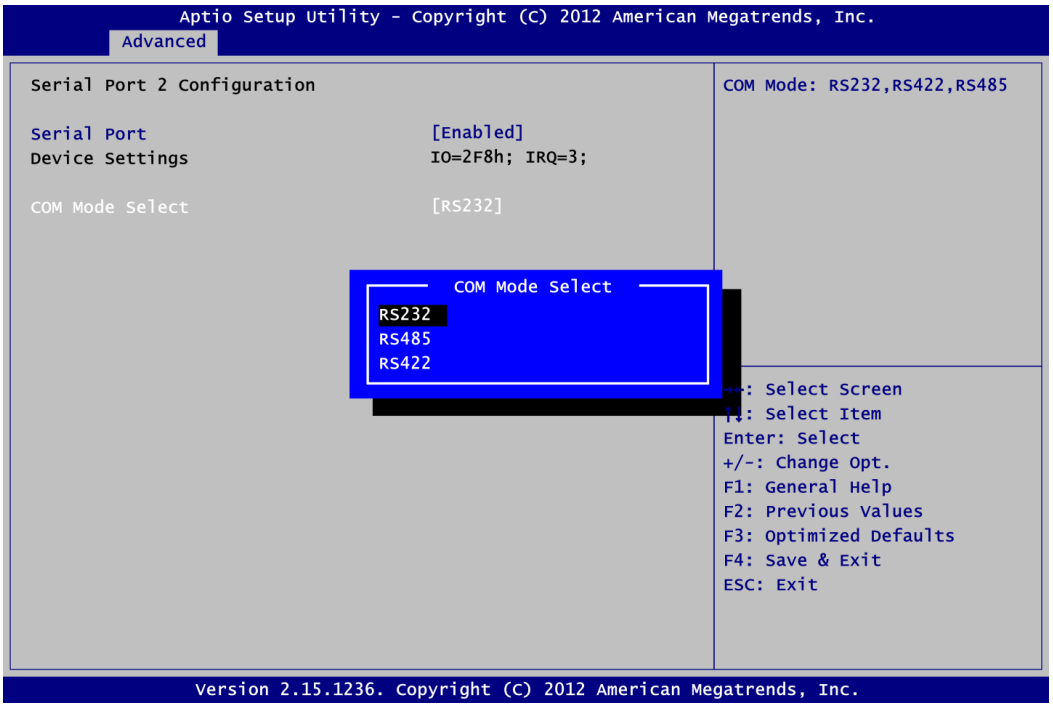
- **Serial Port 1 Configuration**



Serial Port
Enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request address is IRQ4.

COM Mode Select
Use this option to set RS-232/RS-422/RS-485 communication mode for serial port 1.

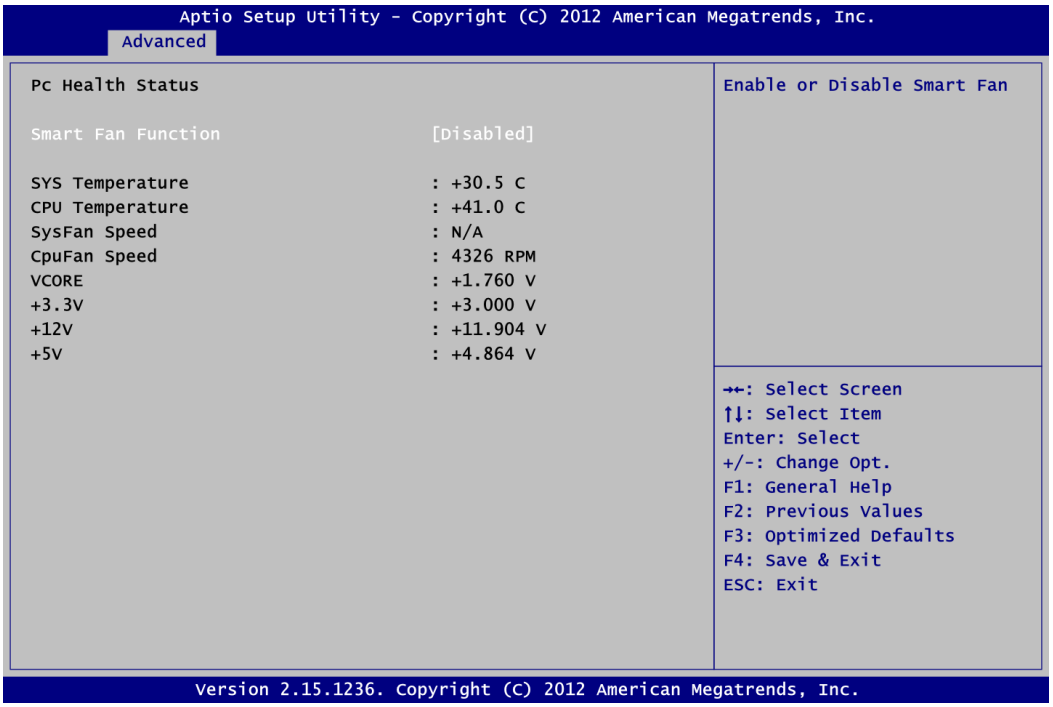
- **Serial Port 2 Configuration**



Serial Port
Enable or disable serial port 2. The optimal setting for base I/O address is 2F8h and for interrupt request address is IRQ3.

COM Mode Select
Use this option to set RS-232/RS-422/RS-485 communication mode for serial port 2.

- **NCT6106D HW Monitor**
  Use this screen for Smart Fan configuration and hardware health status monitoring.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Pc Health Status
Smart Fan Function [Disabled]
SYS Temperature : +30.5 C
CPU Temperature : +41.0 C
SysFan Speed : N/A
CpuFan Speed : 4326 RPM
VCORE : +1.760 V
+3.3V : +3.000 V
+12V : +11.904 V
+5V : +4.864 V
Enable or Disable Smart Fan
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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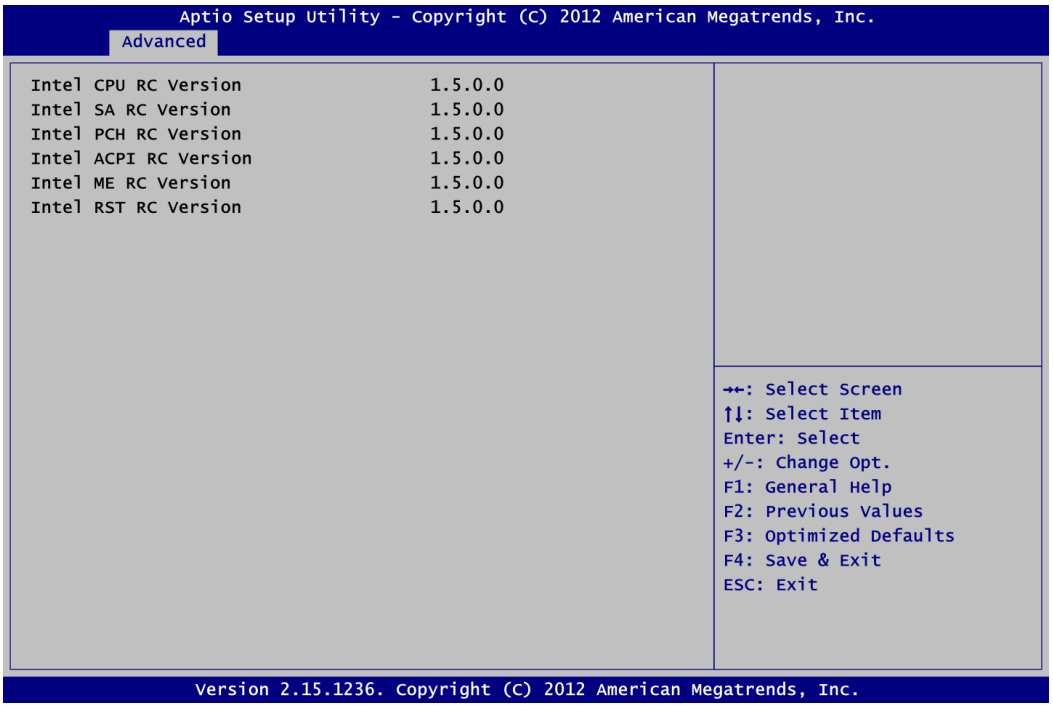
This screen displays the temperature of system and CPU, cooling fan speed in RPM and system voltages (VCORE, +3.3V, +12V and +5V).

Smart Fan Function
Enable or disable Smart Fan function.

- **Intel RC Drivers Version Detail**
  This screen displays Intel® RC drivers version information.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Intel CPU RC Version 1.5.0.0
Intel SA RC Version 1.5.0.0
Intel PCH RC Version 1.5.0.0
Intel ACPI RC Version 1.5.0.0
Intel ME RC Version 1.5.0.0
Intel RST RC Version 1.5.0.0
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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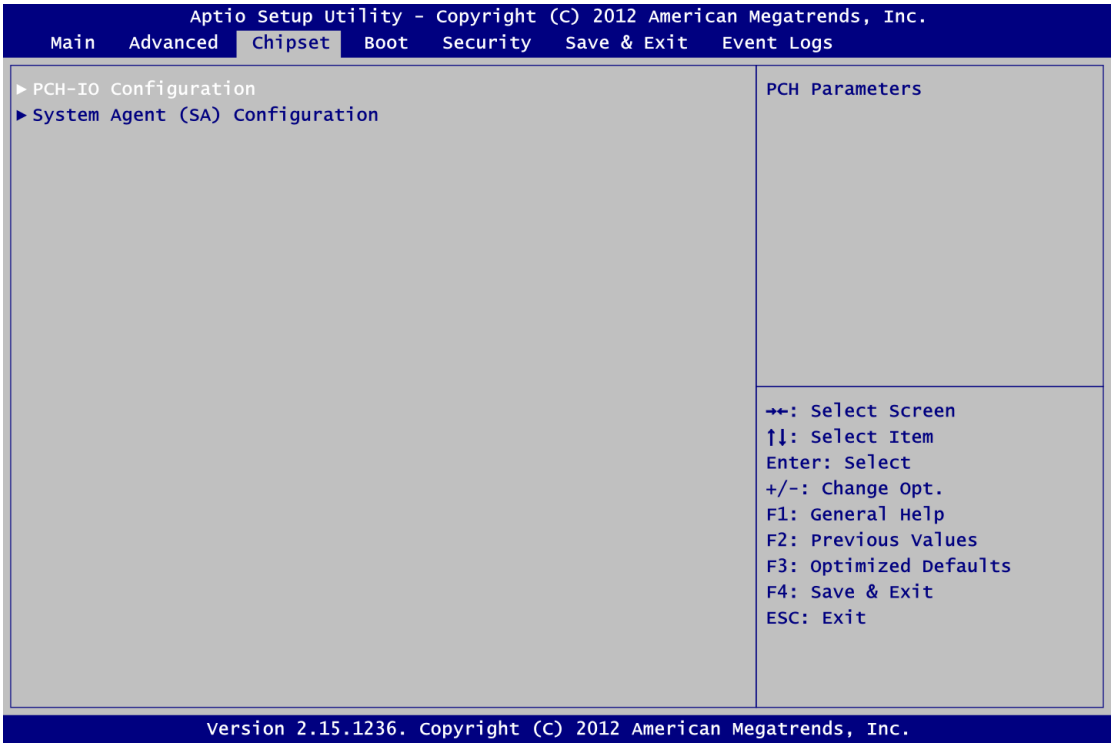
5.5 Chipset Menu

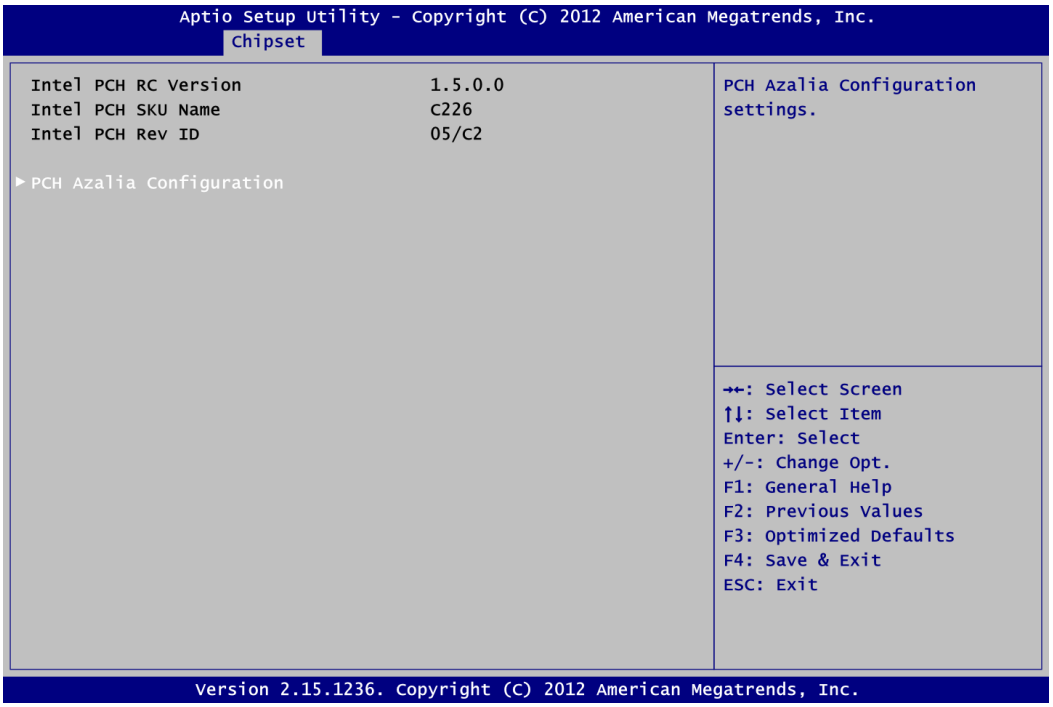
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► PCH-IO Configuration
- ► System Agent (SA) Configuration

For items marked with "►", please press <Enter> for more options.

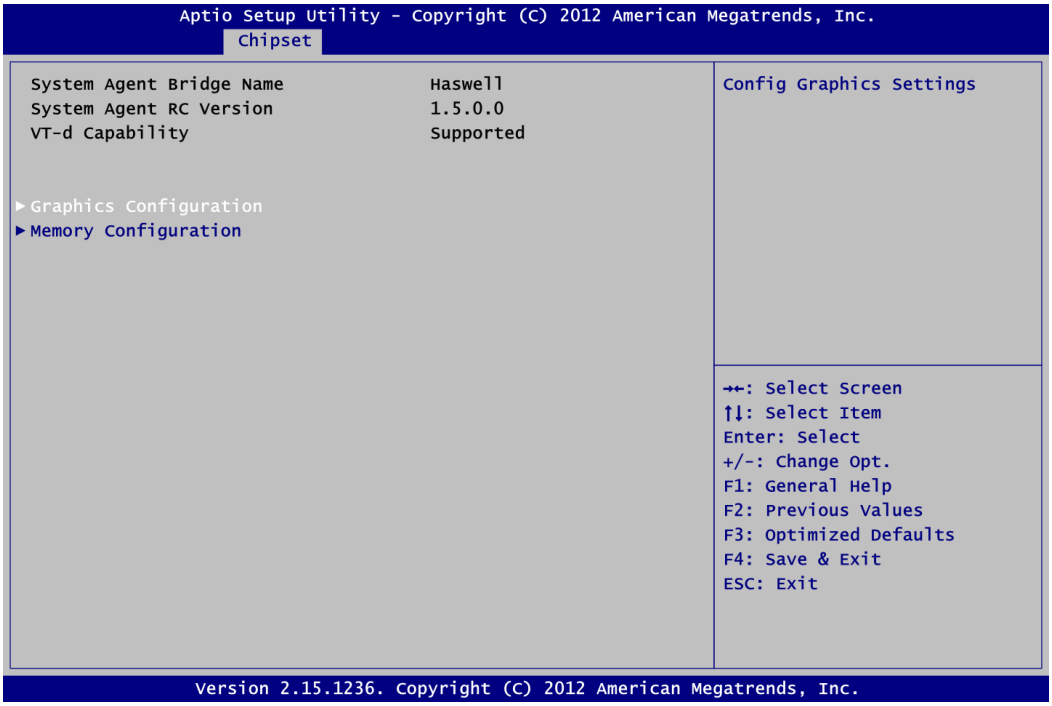


- **PCH-IO Configuration**
  This screen allows you to set PCH parameters.



PCH Azalia Configuration
This item is for PCH Azalia configuration settings.

- **System Agent (SA) Configuration**
  This screen shows System Agent version information and provides function for specifying related parameters.

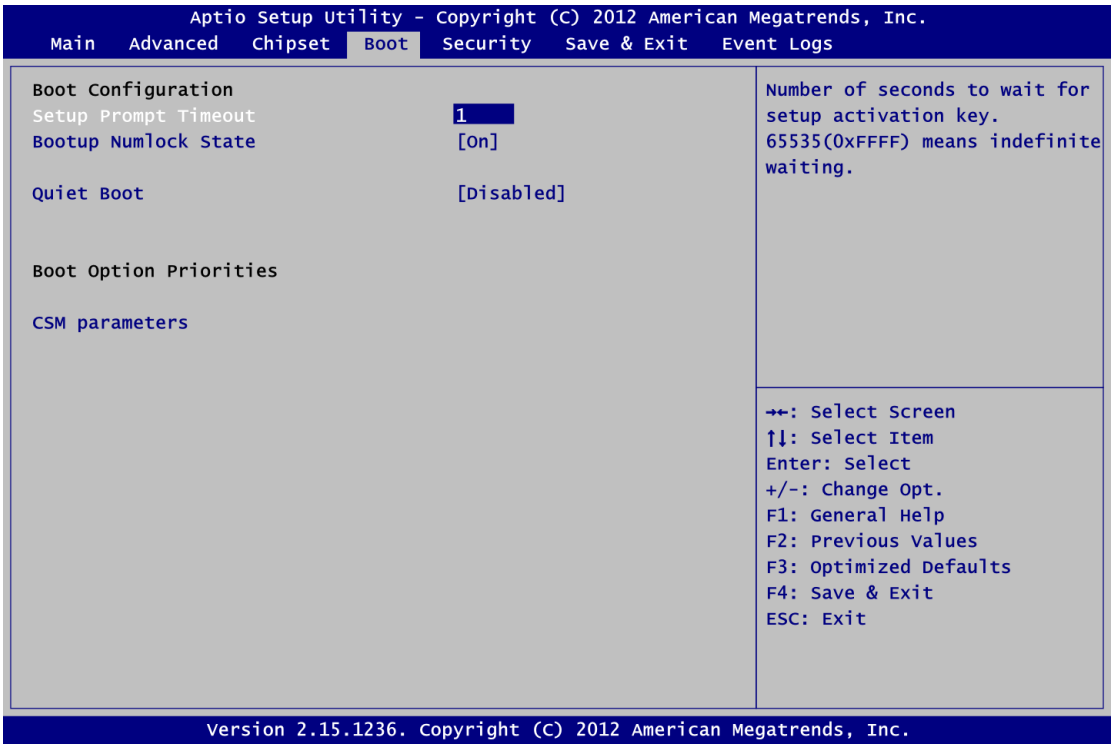


Graphics Configuration
Use this item to set graphics configuration.

Memory Configuration
Use this item to set memory configuration.

5.6 Boot Menu

The Boot menu allows users to change boot options of the system.



- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

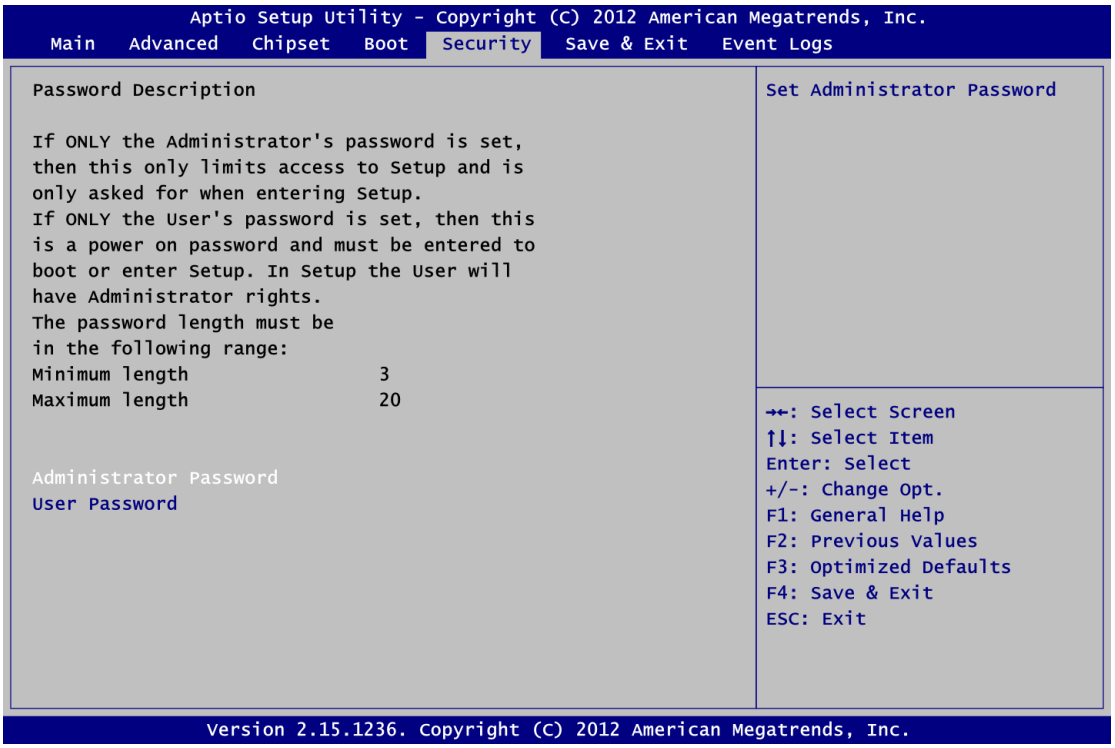
- **Bootup NumLock State**
  Use this item to select the power-on state for the keyboard NumLock.

- **Quiet Boot**
  Select to display either POST output messages or a splash screen during boot-up.

- **Boot Option Priorities**
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

5.7 Security Menu

The Security menu allows users to change the security settings for the system.

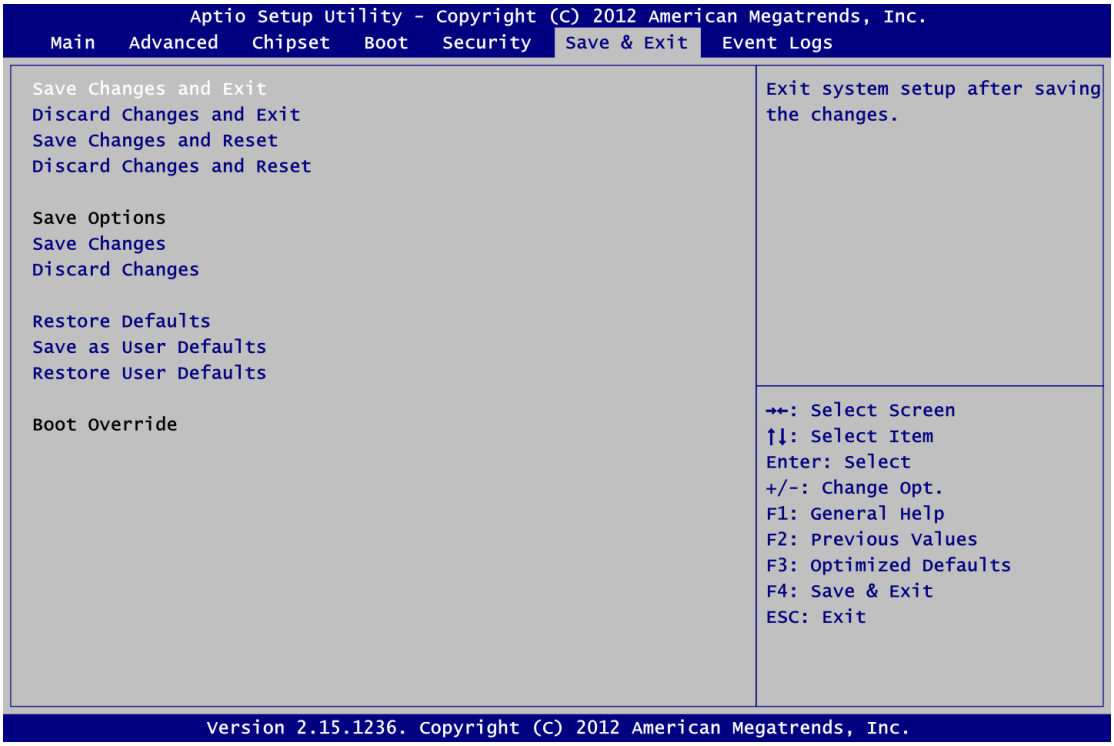

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit Event Logs
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

- **Administrator Password**
  This item indicates whether an administrator password has been set (installed or uninstalled).

- **User Password**
  This item indicates whether a user password has been set (installed or uninstalled).

5.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

- **Save Changes and Reset**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

- **Save Changes**
  When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

- **Restore Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

- **Save as User Defaults**
  Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

- **Restore User Defaults**
  It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

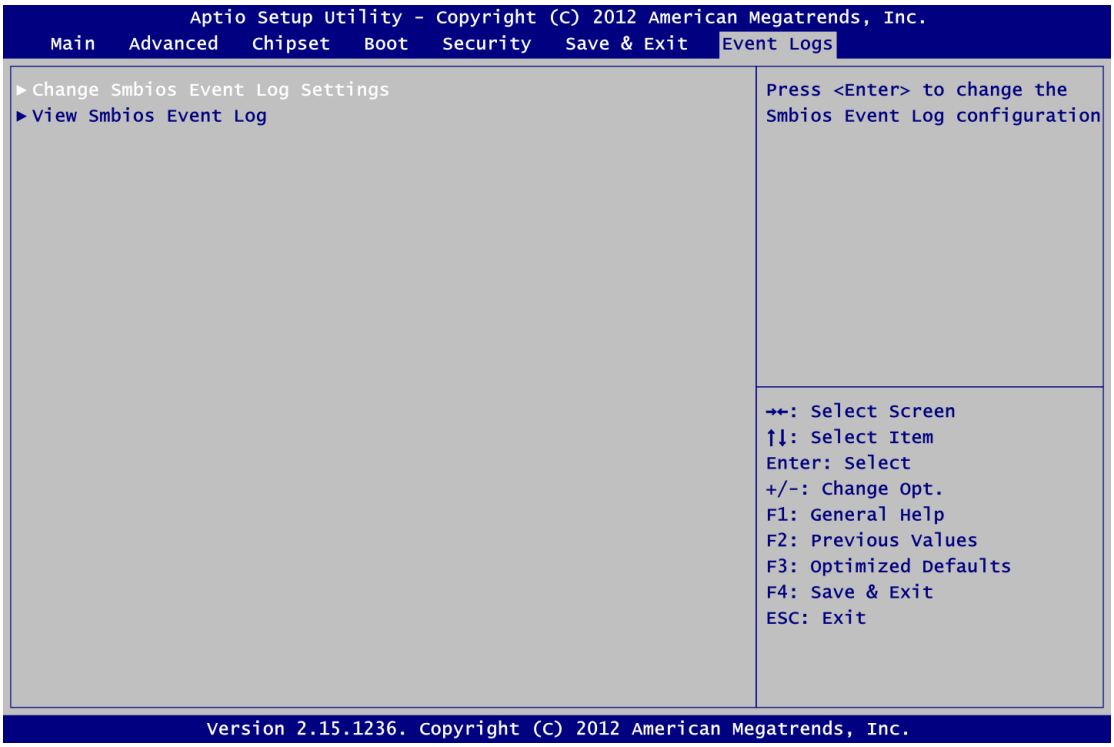
- **Boot Override**
  Select a drive to immediately boot that device regardless of the current boot order.

5.9 Event Logs

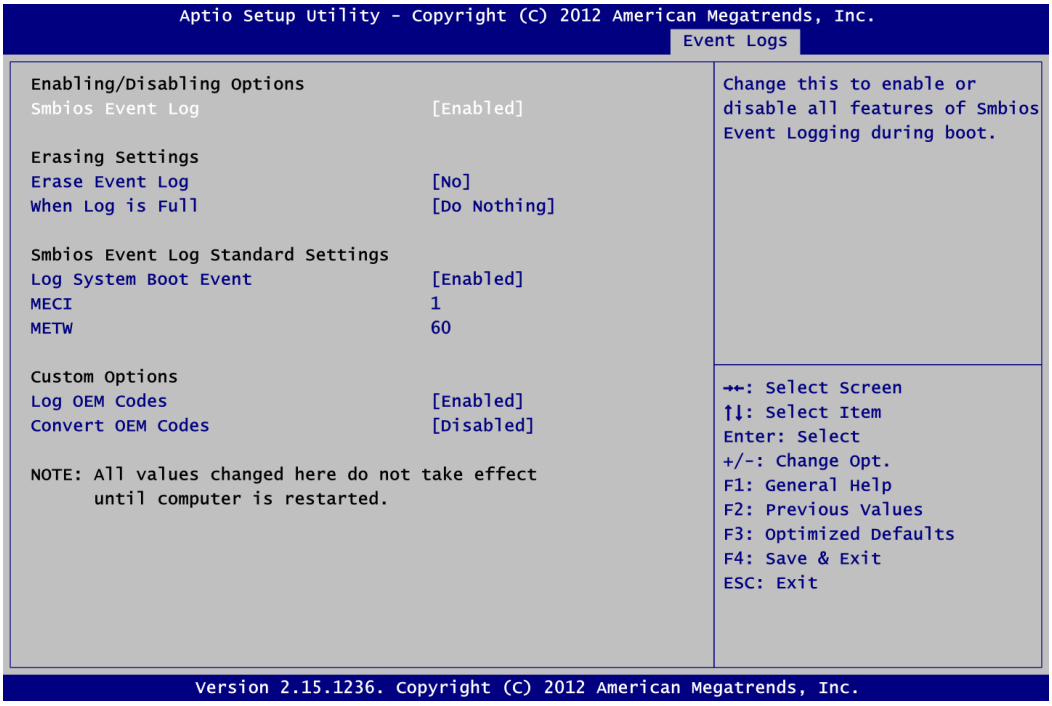
The Even Logs menu allows users to change the advanced Event Log settings and view Event Log. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► Change Smbios Event Log Settings
- ► View Smbios Event Log

For items marked with "►", please press <Enter> for more options.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit Event Logs
►Change Smbios Event Log Settings
►View Smbios Event Log
Press <Enter> to change the Smbios Event Log configuration
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

- **Change Smbios Event Log Settings**
  This screen allows you to change Smbios Event Log settings.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Event Logs
Enabling/Disabling Options
Smbios Event Log [Enabled]
Erasing Settings
Erase Event Log [No]
When Log is Full [Do Nothing]
Smbios Event Log Standard Settings
Log System Boot Event [Enabled]
MECI 1
METW 60
Custom Options
Log OEM Codes [Enabled]
Convert OEM Codes [Disabled]
NOTE: All values changed here do not take effect until computer is restarted.
Change this to enable or disable all features of Smbios Event Logging during boot.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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Smbios Event Log
Enable or disable all features of Smbios Event Logging during boot.

Erase Event Log
Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset. Configuration options are No, Yes Next reset and Yes Every reset.

When Log is Full
Choose options for reactions to a full Smbios Event Log. Configuration options are Do Nothing and Erase Immediately.

Log System Boot Event
Enable and disable Log System Boot Event.

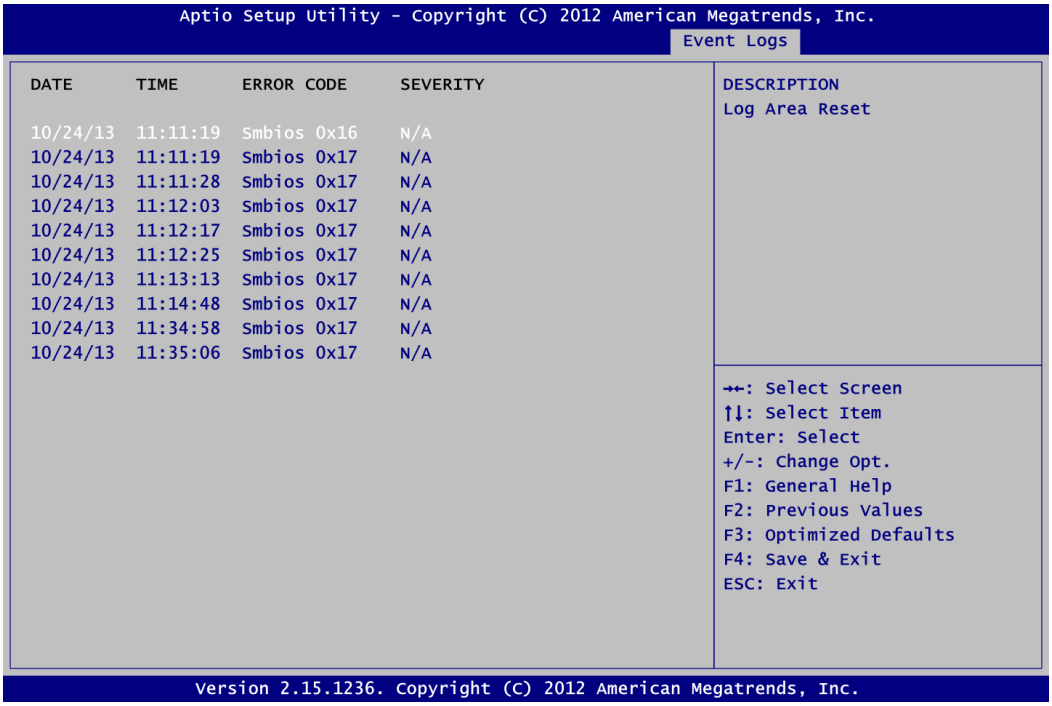
MECI (Mutiple Event Count Increment)
The number of occurrences of a duplicate event that must pass before the multiple-event counter associated with the log entry is updated, specified as a numeric value in the range 1 to 33.

METW (Mutiple Event Time Window)
The number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

Log OEM Codes
Enable or disable the logging of EFI Status Codes as OEM Codes (if not already converted to legacy).

Convert OEM Codes
Enable or disable the converting of EFI Status Codes to Standard Smbios Types (Not all may be translated).

- **View Smbios Event Log**
  Press <Enter> to view the Smbios Event Log records.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Event Logs
DATE TIME ERROR CODE SEVERITY
10/24/13 11:11:19 Smbios 0x16 N/A
10/24/13 11:11:19 Smbios 0x17 N/A
10/24/13 11:11:28 Smbios 0x17 N/A
10/24/13 11:12:03 Smbios 0x17 N/A
10/24/13 11:12:17 Smbios 0x17 N/A
10/24/13 11:12:25 Smbios 0x17 N/A
10/24/13 11:13:13 Smbios 0x17 N/A
10/24/13 11:14:48 Smbios 0x17 N/A
10/24/13 11:34:58 Smbios 0x17 N/A
10/24/13 11:35:06 Smbios 0x17 N/A
DESCRIPTION
Log Area Reset
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

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Appendix A
Watchdog Timer

About Watchdog Timer

After the system stops working for a while, it can be auto-reset by the watchdog timer. The integrated watchdog timer can be set up in the system reset mode by program.

How to Use Watchdog Timer

Start
↓
Un-Lock WDT:
O 2E 87 ; Un-lock super I/O
O 2E 87 ; Un-lock super I/O
↓
Select Logic device:
O 2E 07
O 2F 08
↓
Set Second or Minute:
O 2E F0
O 2F N ; N=00 or 08 (See *Note* below)
↓
Set base timer:
O 2E F1
O 2F M ; M=00,01,02,…FF(Hex) ,Value=0 to 255
↓
WDT counting re-set timer:
O 2E F1
O 2F M ; M=00,01,02,…FF (See *Note* below)
↓
IF No re-set timer:
; WDT time-out, generate RESET

;IF to disable WDT:
O 2E 30
O 2F 00 ; Can be disabled at any time

- Timeout Value Range
  - 1 to 255
  - Minute / Second

Note:

*If **N**=00h, the time base is set to second.*
***M** = time value*
00h: Time-out Disable
01h: Time-out occurs after 1 second
02h: Time-out occurs after 2 seconds
03h: Time-out occurs after 3 seconds
.
.
FFh: Time-out occurs after 255 seconds

*If **N**=08h, the time base is set to minute.*
***M** = time value*
00h: Time-out Disable
01h: Time-out occurs after 1 minute
02h: Time-out occurs after 2 minutes
03h: Time-out occurs after 3 minutes
.
.
FFh: Time-out occurs after 255 minutes

Appendix B
Digital I/O

Digital I/O Software Programming

- I2C to GPIO PCA9554PW GPIO[3:0] is Output, GPIO[7:4] is Input.
- I2C address: 0b0100100x.
- IOBASE: 0xF040
- Registers:

Command byte

Command	Protocol	Function
0	Read byte	Input port register
1	Read/write byte	Output port register
2	Read/write byte	Polarity inversion register
3	Read/write byte	Configuration register

The command byte is the first byte to follow the address byte during a write transmission. It is used as a pointer to determine which of the following registers will be written or read.

Register 0: Input port register.
This register is a read-only port. It reflects the incoming logic levels of the pins, regardless of whether the pin is defined as an input or an output by Register 3. Writes to this register have no effect.

The default 'X' is determined by the externally applied logic level, normally '1' when no external signal externally applied because of the internal pull-up resistors.

Bit	Symbol	Access	Value	Description
7	I7	Read only	X	Determined by externally applied logic level.
6	I6	Read only	X	
5	I5	Read only	X	
4	I4	Read only	X	
3	I3	Read only	X	
2	I2	Read only	X	
1	I1	Read only	X	
0	I0	Read only	X	

Register 1: Output port register.
This register reflects the outgoing logic levels of the pins defined as outputs by Register 3. Bit values in this register have no effect on pins defined as inputs. Reads from this register return the value that is in the flip-flop controlling the output selection, not the actual pin value.

Bit	Symbol	Access	Value	Description
7	O7	R	1*	Reflects outgoing logic levels of pins defined as outputs by Register 3.
6	O6	R	1*	
5	O5	R	1*	
4	O4	R	1*	
3	O3	R	1*	
2	O2	R	1*	
1	O1	R	1*	
0	O0	R	1*	

* : Default value

Register 3: Configuration register.
This register configures the directions of the I/O pins. If a bit in this register is set, the corresponding port pin is enabled as an input with high-impedance output driver. If a bit in this register is cleared, the corresponding port pin is enabled as an output. At reset, the I/Os are configured as inputs with a weak pull-up to V_{DD}.

Bit	Symbol	Access	Value	Description
7	C7	R/W	1*	Configure the directions of the I/O pins. 0 = Corresponding port pin enabled as an output. 1 = Corresponding port pin configured as input (default value).
6	C6	R/W	1*	
5	C5	R/W	1*	
4	C4	R/W	1*	
3	C3	R/W	1*	
2	C2	R/W	1*	
1	C1	R/W	1*	
0	C0	R/W	1*	

* : Default value

Appendix C
Configuring SATA for RAID

Configuring SATA Hard Drive(s) for RAID Function

Before you begin the SATA configuration, please prepare:

- Two SATA hard drives (to ensure optimal performance, it is recommended that you use two hard drives with identical model and capacity). If you do not want to create RAID with the SATA controller, you may prepare only one hard drive.

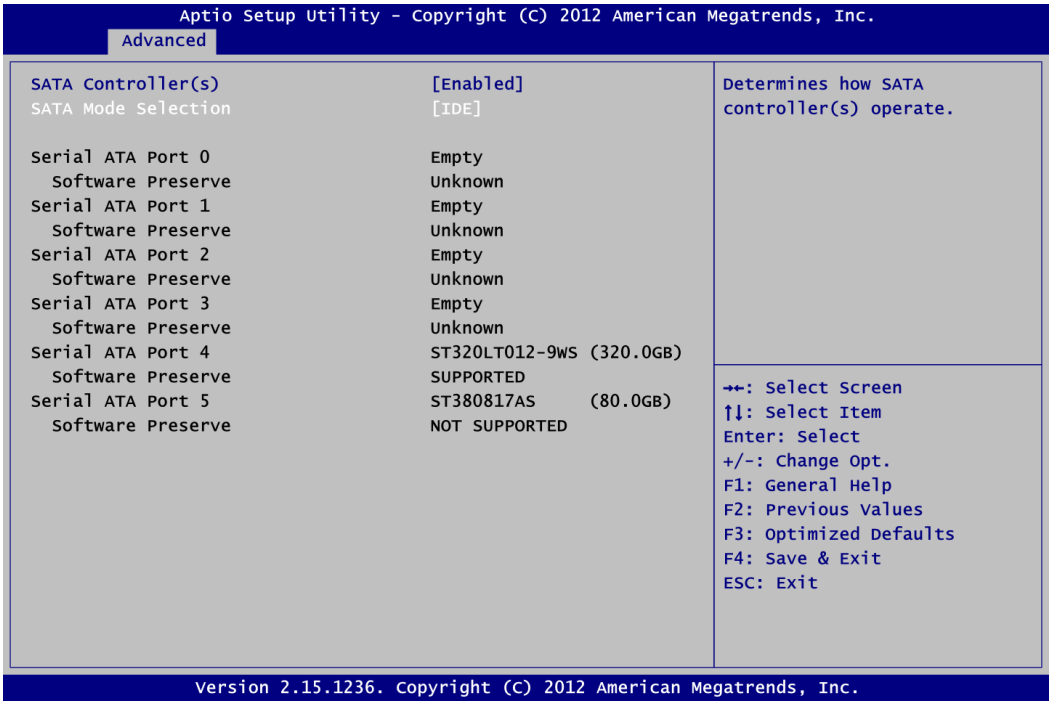
Please follow up the steps below to configure SATA hard drive(s):

1. Install SATA hard drive(s) in your system.
2. Enter the BIOS Setup to configure SATA controller mode and boot sequence.
3. Configure RAID by the RAID BIOS.

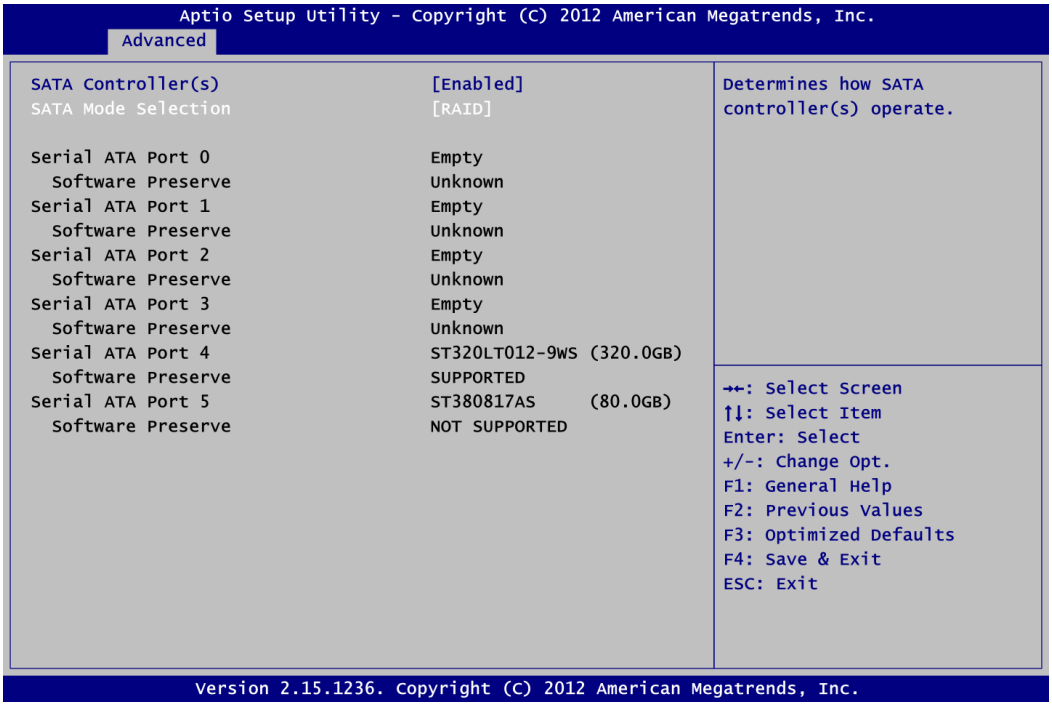
1. Installing SATA hard drive(s) in your system.
Connect one end of the SATA signal cable to the rear of the SATA hard drive, and the other end to available SATA port(s) on the board. Then, connect the power connector of power supply to the hard drive.

2. Configuring SATA controller mode and boot sequence by the BIOS Setup.
You have to make sure whether the SATA controller is configured correctly by system BIOS Setup and set up BIOS boot sequence for the SATA hard drive(s).

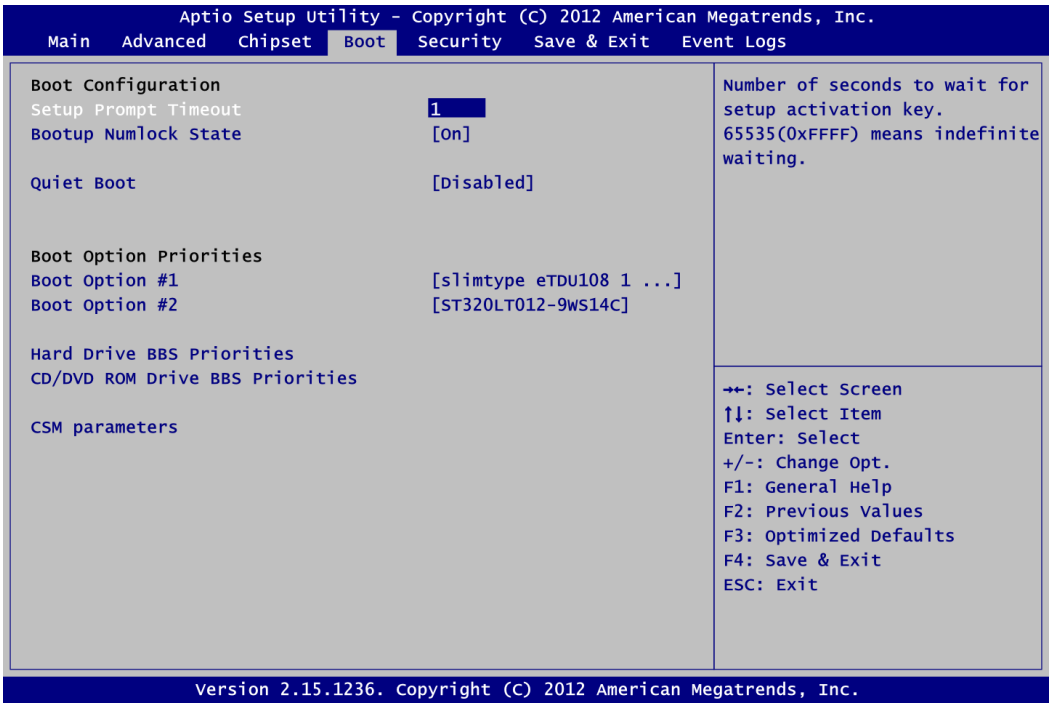
2.1. Turn on your system, and then press the <Del> button to enter BIOS Setup during running POST (Power-On Self Test). If you want to create RAID, just go to the Advanced Settings menu/SATA Configuration, select the “SATA Mode Selection”, and press <Enter> for more options.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
SATA Controller(s) [Enabled]
SATA Mode Selection [IDE]
Serial ATA Port 0 Empty
Software Preserve Unknown
Serial ATA Port 1 Empty
Software Preserve Unknown
Serial ATA Port 2 Empty
Software Preserve Unknown
Serial ATA Port 3 Empty
Software Preserve Unknown
Serial ATA Port 4 ST320LT012-9WS (320.0GB)
Software Preserve SUPPORTED
Serial ATA Port 5 ST380817AS (80.0GB)
Software Preserve NOT SUPPORTED
Determines how SATA controller(s) operate.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

A list of options appears, please select “RAID”.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
SATA Controller(s) [Enabled]
SATA Mode Selection [RAID]
Serial ATA Port 0 Empty
Software Preserve Unknown
Serial ATA Port 1 Empty
Software Preserve Unknown
Serial ATA Port 2 Empty
Software Preserve Unknown
Serial ATA Port 3 Empty
Software Preserve Unknown
Serial ATA Port 4 ST320LT012-9WS (320.0GB)
Software Preserve SUPPORTED
Serial ATA Port 5 ST380817AS (80.0GB)
Software Preserve NOT SUPPORTED
Determines how SATA controller(s) operate.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

2.2. Set DVD-ROM for First Boot Option under the Boot Settings menu to boot DVD-ROM after system restarts.

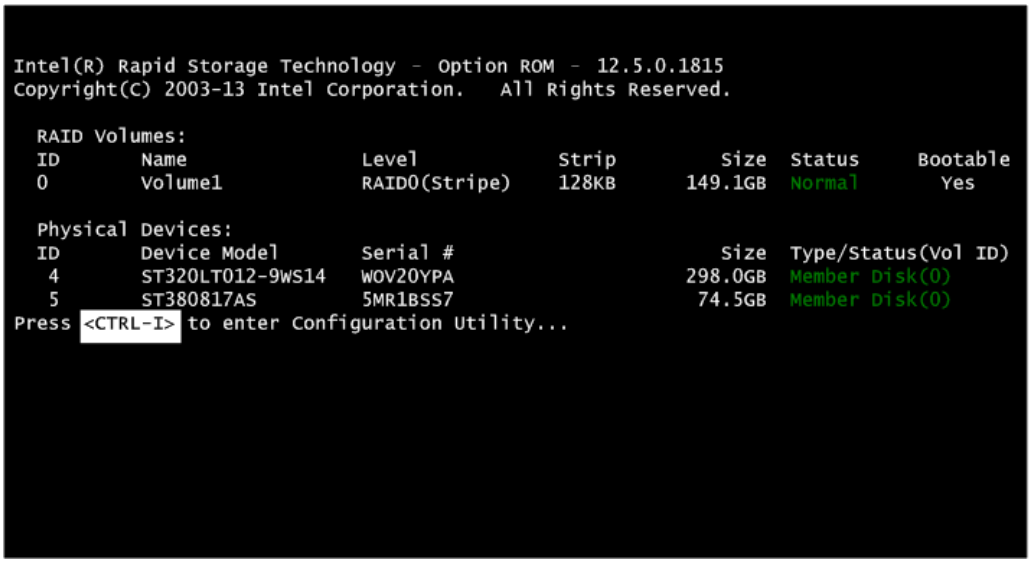


2.3. Save and exit the BIOS Setup.

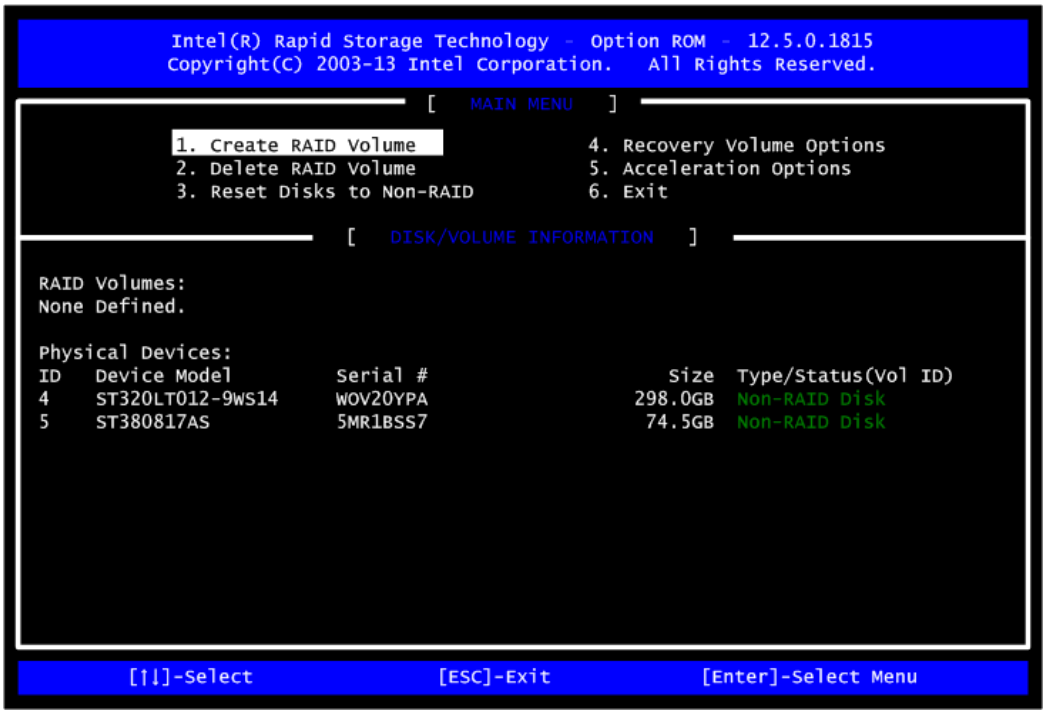
3. Configuring RAID by the RAID BIOS.

Enter the RAID BIOS setup utility to configure a RAID array. Skip this step and proceed if you do not want to create a RAID.

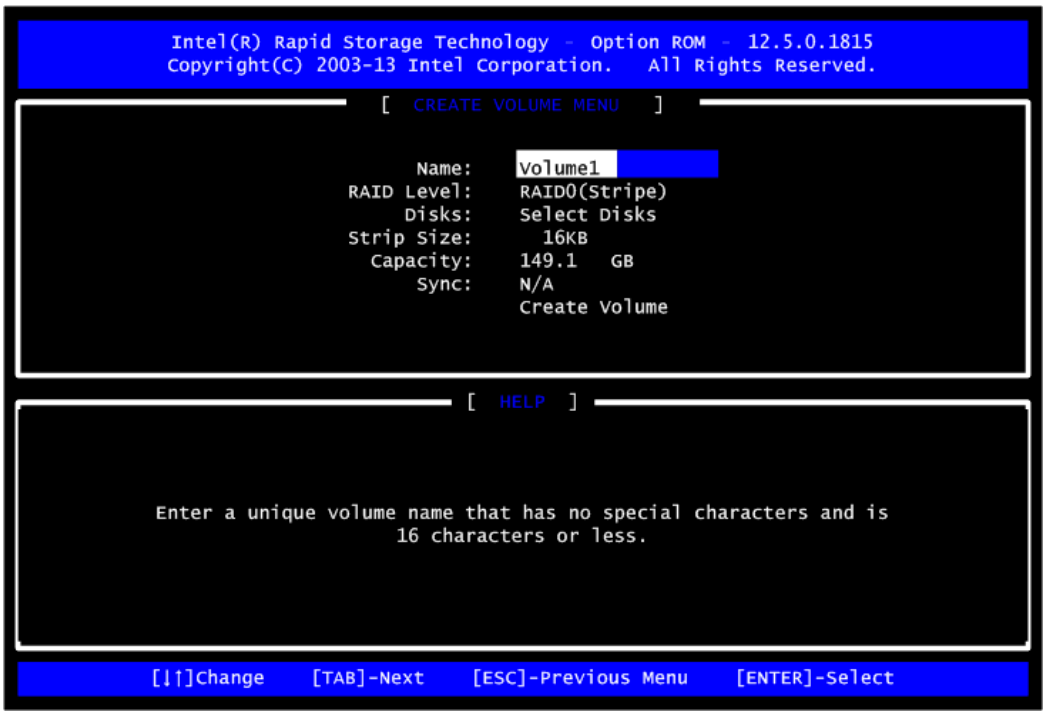
3.1. After the POST memory testing and before the operating system booting, a message "Press <Ctrl-I> to enter Configuration Utility" shows up, accordingly, press <Ctrl + I> to enter the RAID BIOS setup utility.


Intel(R) Rapid Storage Technology - Option ROM - 12.5.0.1815
Copyright(C) 2003-13 Intel Corporation. All Rights Reserved.
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume1 RAID0(Stripe) 128KB 149.1GB Normal Yes
Physical Devices:
ID Device Model Serial # Size Type/Status(Vol ID)
4 ST320LT012-9WS14 WOV20YPA 298.0GB Member Disk(0)
5 ST380817AS 5MR1BSS7 74.5GB Member Disk(0)
Press <CTRL-I> to enter Configuration Utility...

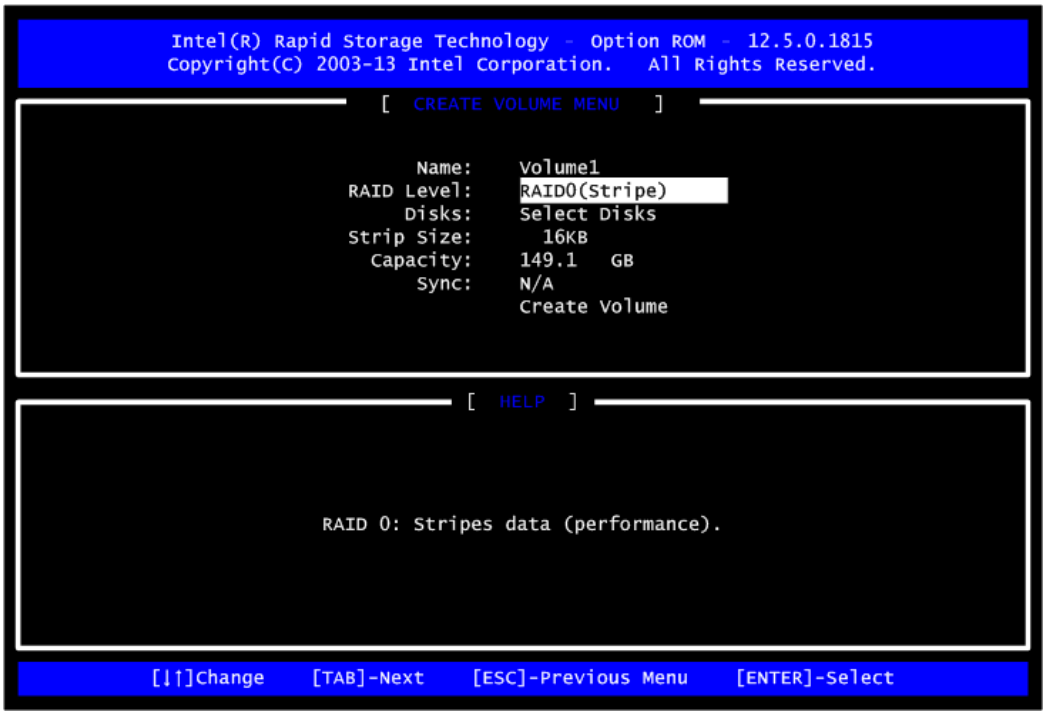
3.2. After you press <Ctrl + I>, the Create RAID Volume screen will appear. If you want to create a RAID array, select the Create RAID Volume option in the Main Menu and press <Enter>.


Intel(R) Rapid Storage Technology - Option ROM - 12.5.0.1815
Copyright(C) 2003-13 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Recovery Volume Options
5. Acceleration Options
6. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
None Defined.
Physical Devices:
ID Device Model Serial # Size Type/Status(Vol ID)
4 ST320LT012-9WS14 WOV20YPA 298.0GB Non-RAID Disk
5 ST380817AS 5MR1BSS7 74.5GB Non-RAID Disk
[↑↓]-Select [ESC]-Exit [Enter]-Select Menu

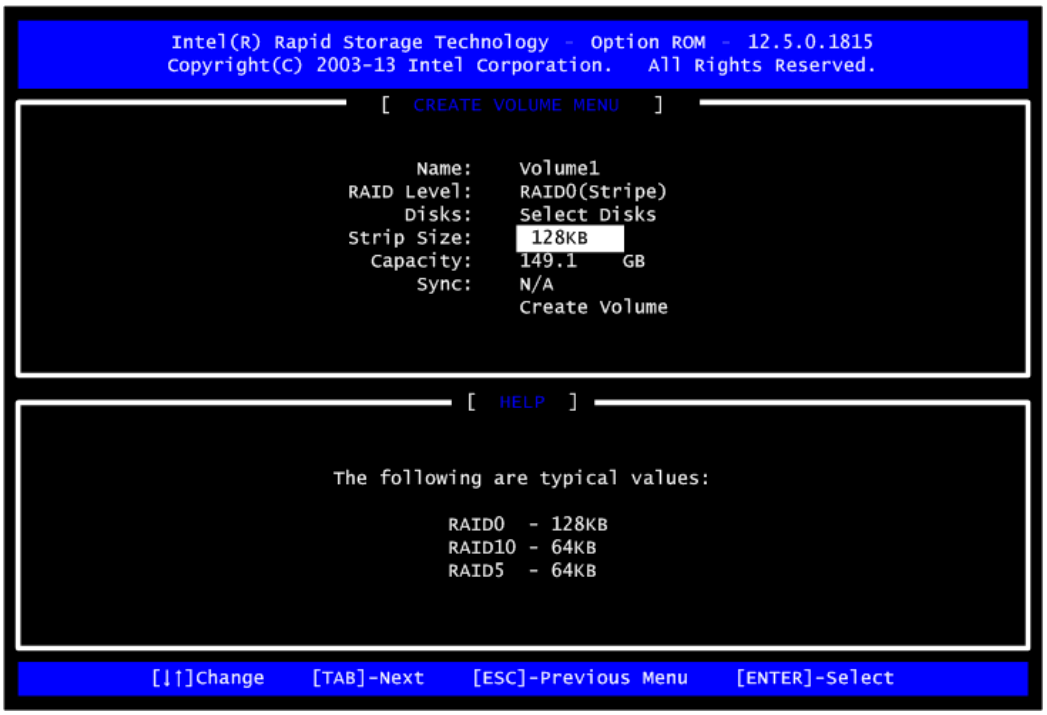
3.3. After entering the Create Volume Menu screen, you can type the disk array name with 1~16 letters (letters cannot be special characters) in the item “Name”.


Intel(R) Rapid Storage Technology - Option ROM - 12.5.0.1815
Copyright(C) 2003-13 Intel Corporation. All Rights Reserved.
[CREATE VOLUME MENU]
Name: Volume1
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 16KB
Capacity: 149.1 GB
Sync: N/A
Create Volume
[HELP]
Enter a unique volume name that has no special characters and is
16 characters or less.
[↓↑]Change [TAB]-Next [ESC]-Previous Menu [ENTER]-Select

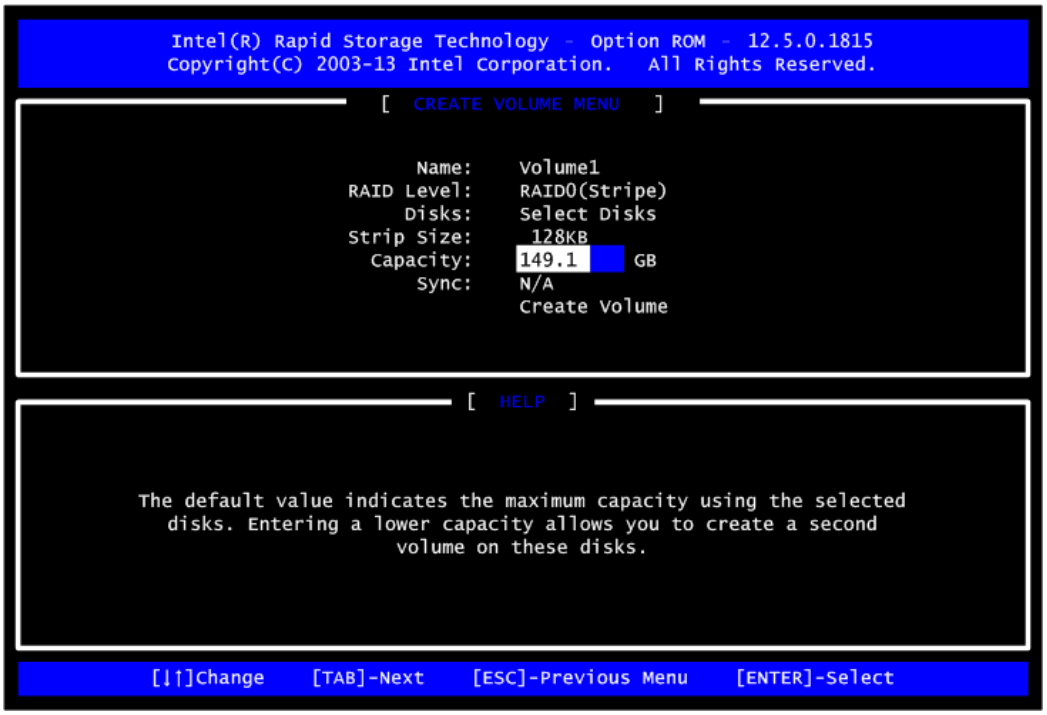
3.4. When finished, press <Enter> to select a RAID level. There are three RAID levels: RAID0, RAID1 and RAID5 and RAID10. Select a RAID level and press <Enter>.


Intel(R) Rapid Storage Technology - Option ROM - 12.5.0.1815
Copyright(C) 2003-13 Intel Corporation. All Rights Reserved.
[CREATE VOLUME MENU]
Name: Volume1
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 16KB
Capacity: 149.1 GB
Sync: N/A
Create Volume
[HELP]
RAID 0: Stripes data (performance).
[↓↑]Change [TAB]-Next [ESC]-Previous Menu [ENTER]-Select

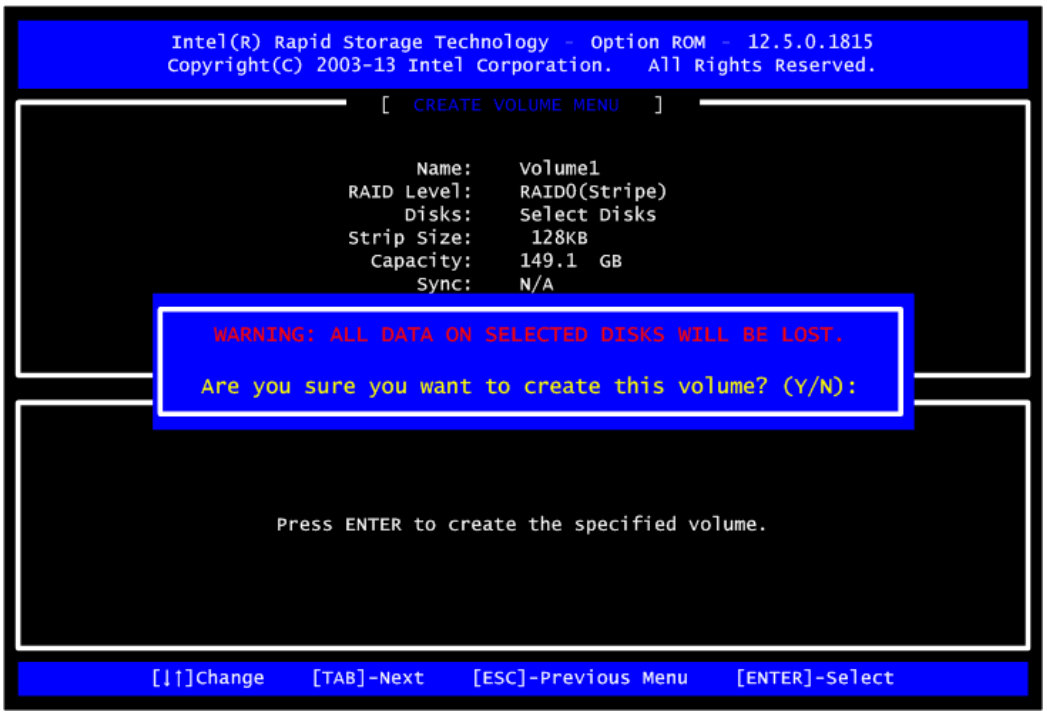
3.5. Set the stripe block size. The KB is the standard unit of stripe block size. The stripe block size can be 4KB to 128KB. After the setting, press <Enter> for the array capacity.



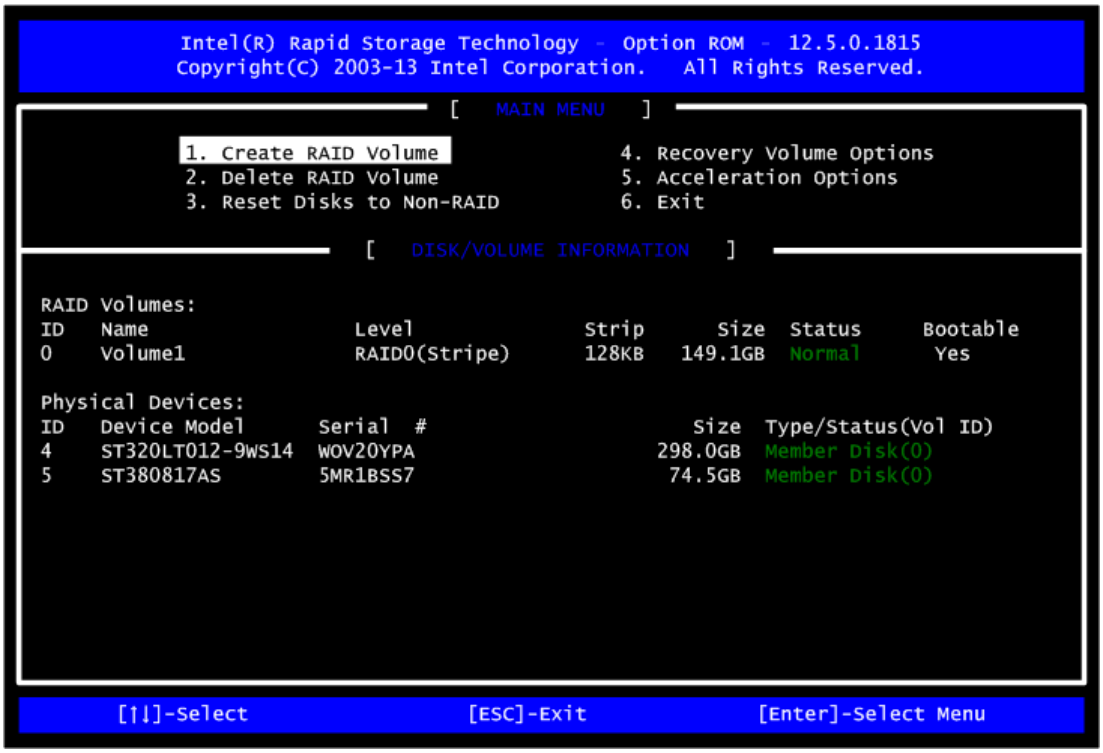
3.6. After setting all the items on the menu, select Create Volume and press <Enter> to start creating the RAID array.


Intel(R) Rapid Storage Technology - Option ROM - 12.5.0.1815
Copyright(C) 2003-13 Intel Corporation. All Rights Reserved.
[CREATE VOLUME MENU]
Name: Volume1
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 149.1 GB
Sync: N/A
Create Volume
[HELP]
The default value indicates the maximum capacity using the selected disks. Entering a lower capacity allows you to create a second volume on these disks.
[↓↑]Change [TAB]-Next [ESC]-Previous Menu [ENTER]-Select

3.7. When prompting the confirmation, press <Y> to create this volume, or <N> to cancel the creation.

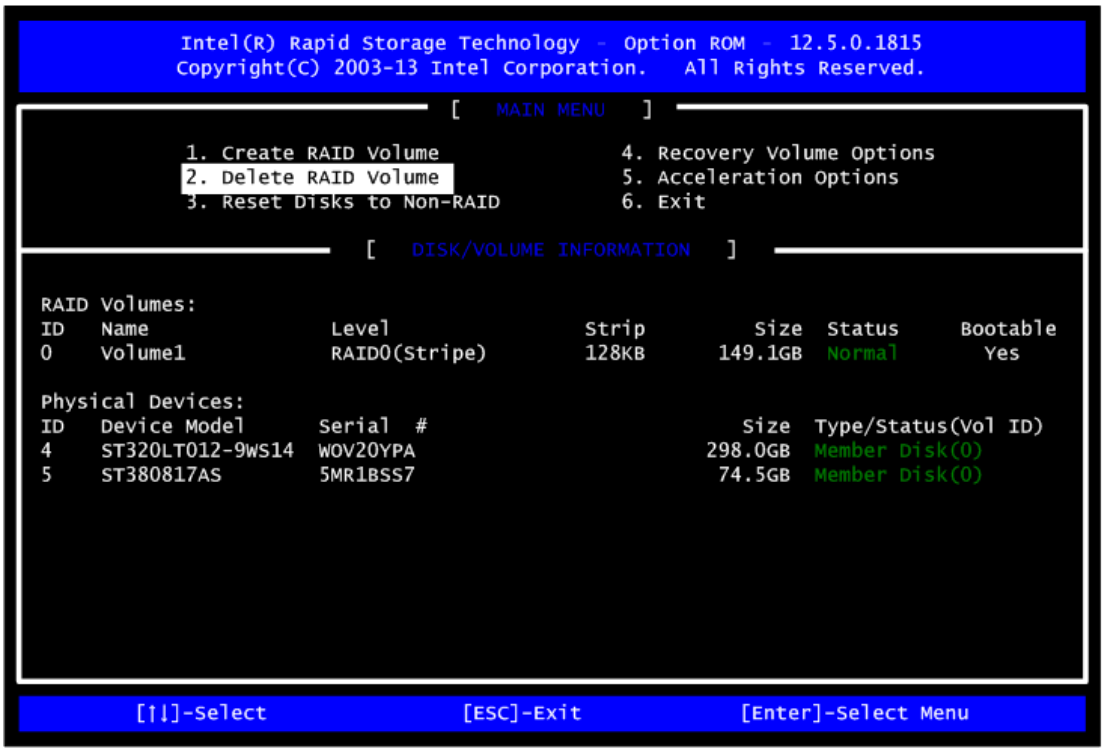

Intel(R) Rapid Storage Technology - Option ROM - 12.5.0.1815
Copyright(C) 2003-13 Intel Corporation. All Rights Reserved.
[CREATE VOLUME MENU]
Name: Volume1
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 149.1 GB
Sync: N/A
WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.
Are you sure you want to create this volume? (Y/N):
Press ENTER to create the specified volume.
[↓↑]Change [TAB]-Next [ESC]-Previous Menu [ENTER]-Select

After the creation is completed, you can see detailed information about the RAID Array in the Disk/Volume Information section, including RAID mode, disk block size, disk name, and disk capacity, etc.


Intel(R) Rapid Storage Technology - Option ROM - 12.5.0.1815
Copyright(C) 2003-13 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Recovery Volume Options
5. Acceleration Options
6. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume1 RAID0(Stripe) 128KB 149.1GB Normal Yes
Physical Devices:
ID Device Model Serial # Size Type/Status(Vol ID)
4 ST320LT012-9WS14 WOV20YPA 298.0GB Member Disk(0)
5 ST380817AS 5MR1BSS7 74.5GB Member Disk(0)
[↑↓]-Select [ESC]-Exit [Enter]-Select Menu

Delete RAID volume

If you want to delete a RAID volume, select the Delete RAID Volume option in Main Menu. Press <Enter> and follow on-screen instructions.


Intel(R) Rapid Storage Technology - Option ROM - 12.5.0.1815
Copyright(C) 2003-13 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Recovery Volume Options
5. Acceleration Options
6. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume1 RAID0(Stripe) 128KB 149.1GB Normal Yes
Physical Devices:
ID Device Model Serial # Size Type/Status(Vol ID)
4 ST320LT012-9WS14 WOV20YPA 298.0GB Member Disk(0)
5 ST380817AS 5MR1BSS7 74.5GB Member Disk(0)
[↑↓]-Select
[ESC]-Exit
[Enter]-Select Menu

Please press <Esc> to exit the RAID BIOS utility. Now, you can proceed to install a SATA driver controller and the operating system.

Appendix D
iAMT Settings

The Intel® Active Management Technology (Intel® iAMT) has decreased a major barrier to IT efficiency that uses built-in platform capabilities and popular third-party management and security applications to allow IT a better discovering, healing, and protection their networked computing assets.

In order to utilize Intel® iAMT you must enter the ME BIOS (<Ctrl + P> during system startup), change the ME BIOS password, and then select "Intel® iAMT" as the manageability feature.

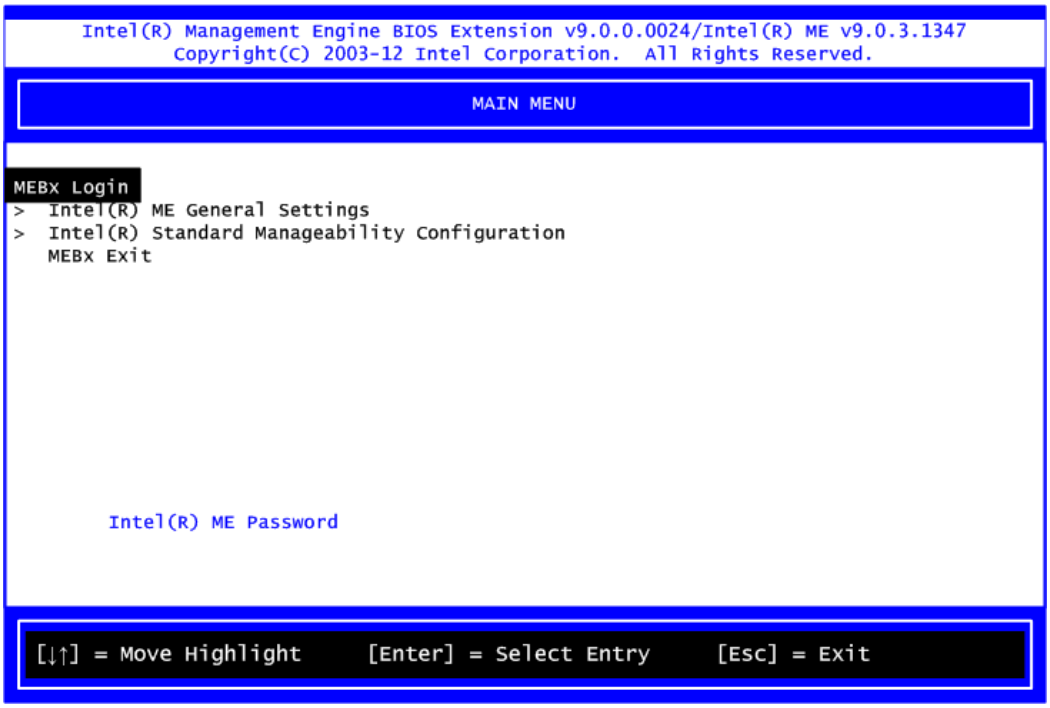
Entering MEBx

1. You must go to BIOS to enable iAMT function.
2. Exit from BIOS after starting iAMT, and press <Ctrl + P> to enter MEBx Setting.

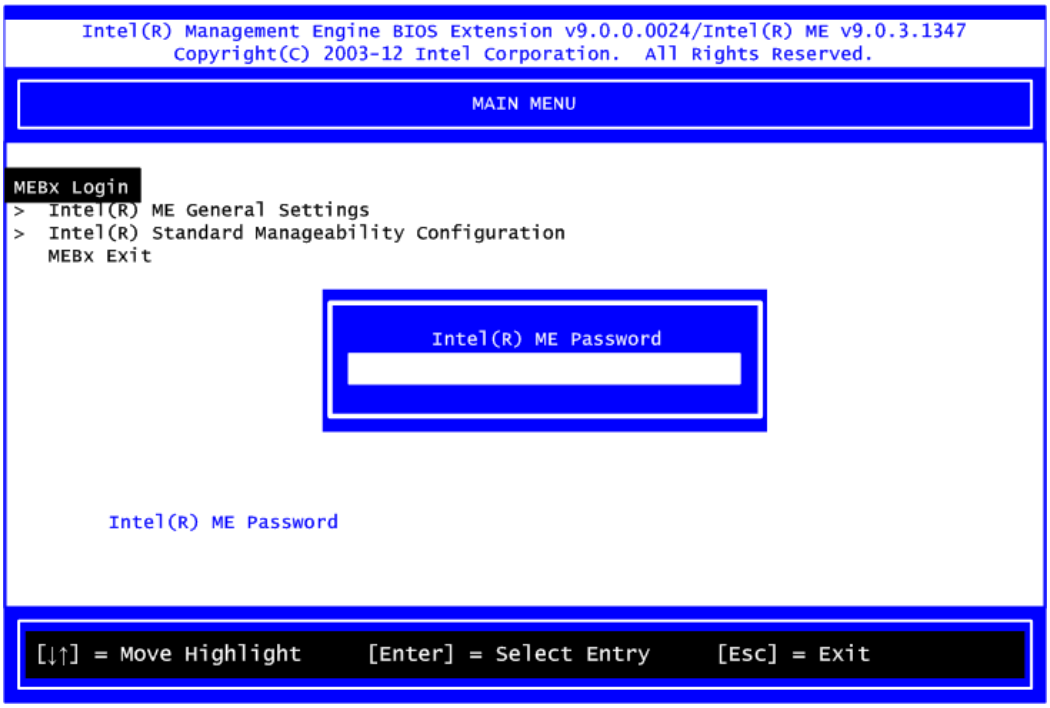
Note: ***It is better to press <Ctrl + P> before the screen popping out.***

Set and Change Password

1. You will be asked to set a password when first log in. The default password is "admin".


Intel(R) Management Engine BIOS Extension v9.0.0.0024/Intel(R) ME v9.0.3.1347
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
MAIN MENU
MEBx Login
> Intel(R) ME General Settings
> Intel(R) Standard Manageability Configuration
MEBx Exit
Intel(R) ME Password
[↓↑] = Move Highlight
[Enter] = Select Entry
[Esc] = Exit

2. You will be asked to change the password before setting ME.


Intel(R) Management Engine BIOS Extension v9.0.0.0024/Intel(R) ME v9.0.3.1347
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
MAIN MENU
MEBx Login
> Intel(R) ME General Settings
> Intel(R) Standard Manageability Configuration
MEBx Exit
Intel(R) ME Password
Intel(R) ME Password
[↓↑] = Move Highlight
[Enter] = Select Entry
[Esc] = Exit

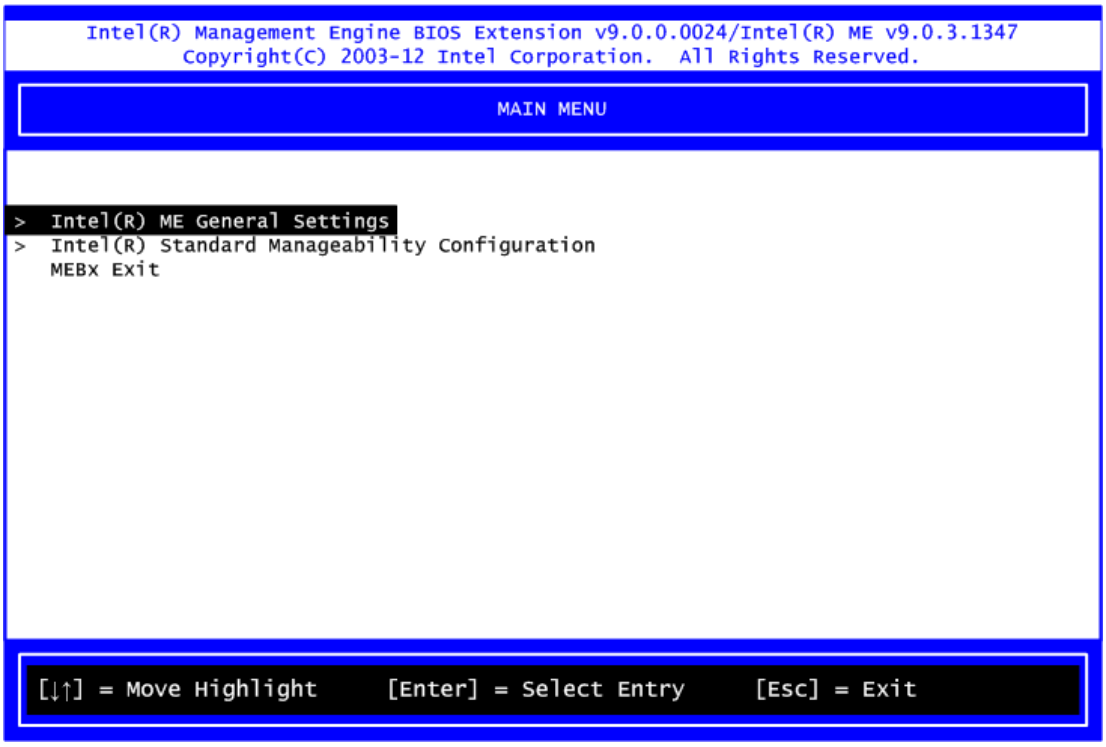
3. You must confirm your new password while revising. The new password must contain: (example: **!!11qqQQ**) (default value).

   - Eight characters
   - One upper case
   - One lower case
   - One number
   - One special symbol, such as ! 、 $ or ; ，(、 " , excepted)

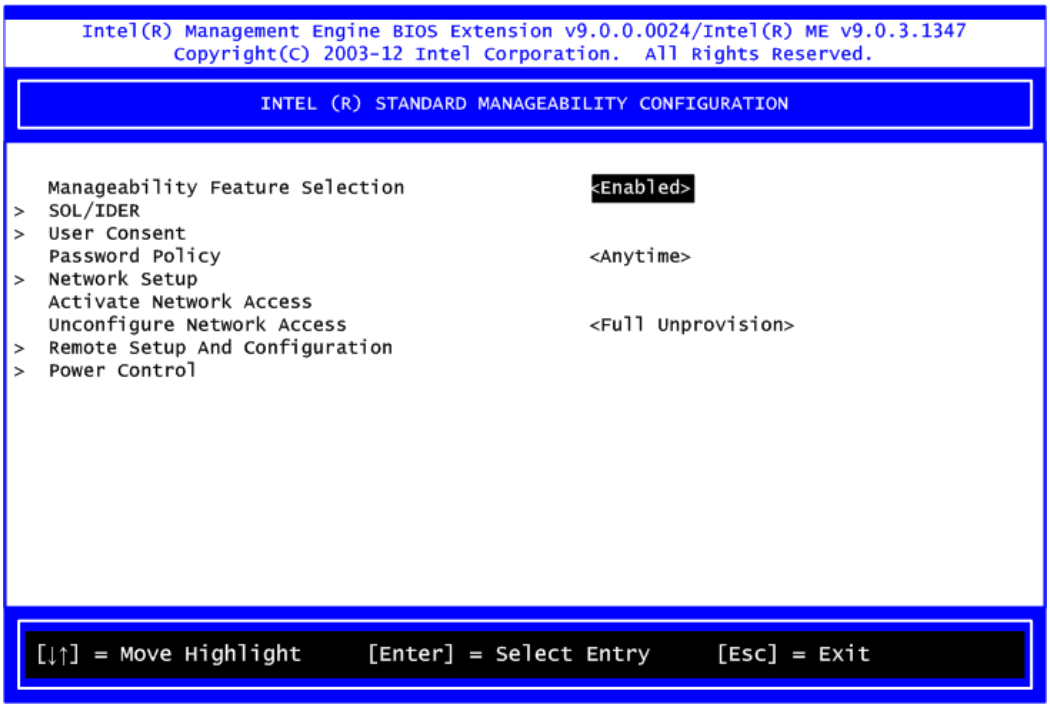
   Underline (_) and space are valid characters for password, but they won't make higher complexity.

iAMT Settings

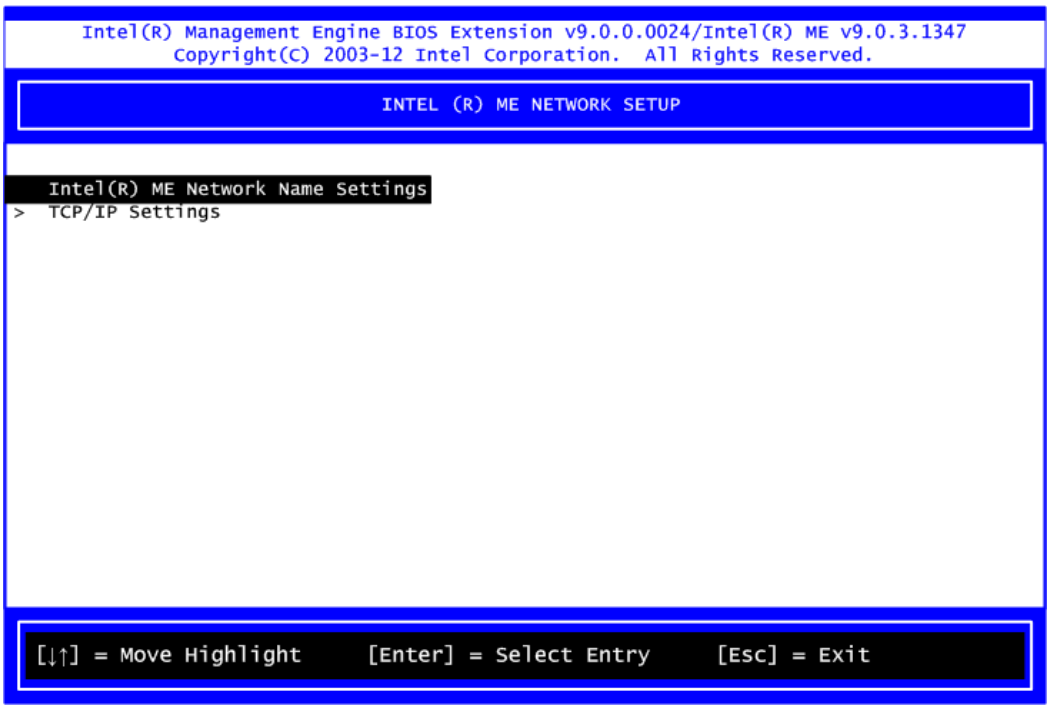
Select Intel® iAMT configuration and press <Enter>.

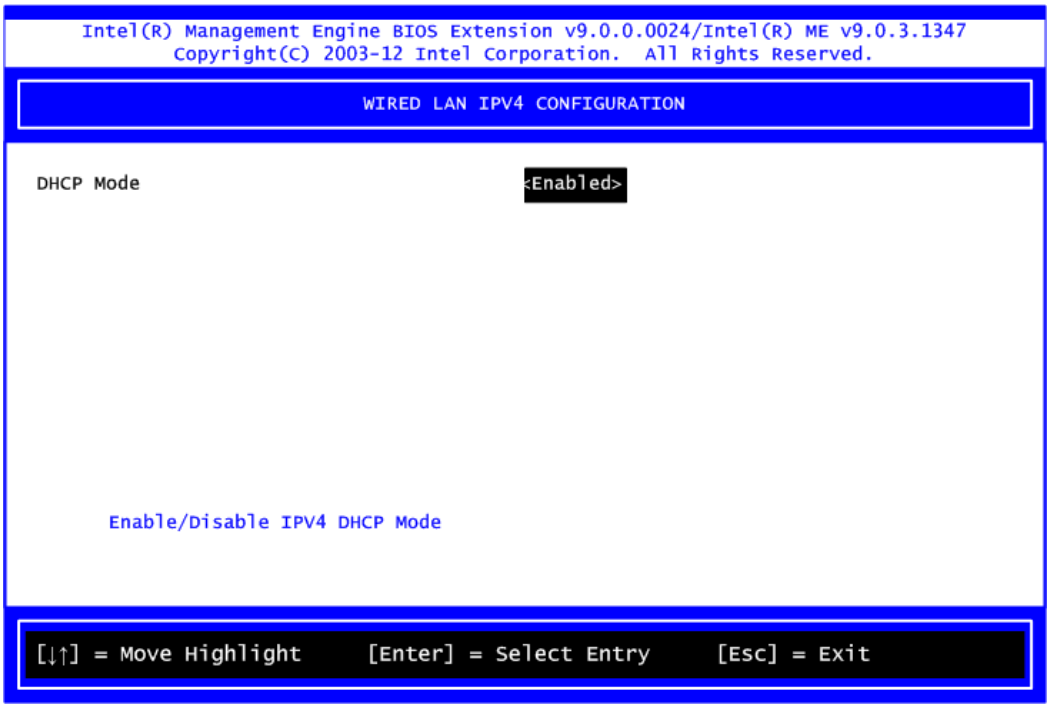

Intel(R) Management Engine BIOS Extension v9.0.0.0024/Intel(R) ME v9.0.3.1347
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
MAIN MENU
> Intel(R) ME General Settings
> Intel(R) Standard Manageability Configuration
MEBx Exit
[↓↑] = Move Highlight
[Enter] = Select Entry
[Esc] = Exit

1. Select Network Setup to configure iAMT.



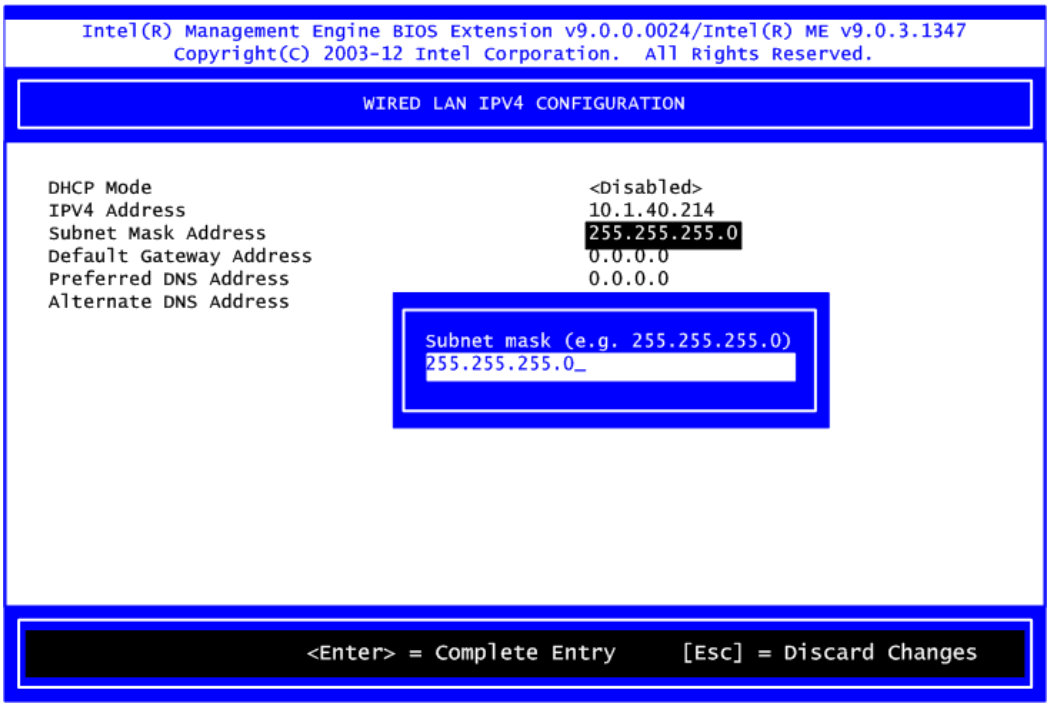
2. Select TCP/IP to get into Network interface and set it to Enabled. Get into DHCP Mode and set it to Disabled.


Intel(R) Management Engine BIOS Extension v9.0.0.0024/Intel(R) ME v9.0.3.1347
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
INTEL (R) ME NETWORK SETUP
Intel(R) ME Network Name Settings
> TCP/IP Settings
[↓↑] = Move Highlight
[Enter] = Select Entry
[Esc] = Exit

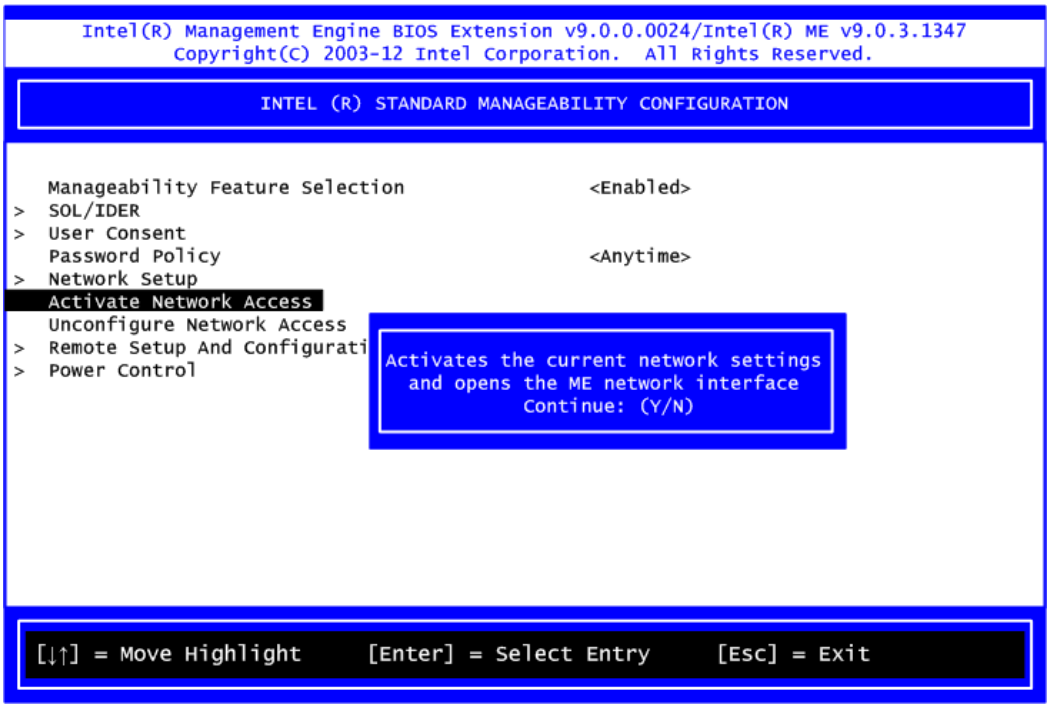

Intel(R) Management Engine BIOS Extension v9.0.0.0024/Intel(R) ME v9.0.3.1347
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
WIRED LAN IPV4 CONFIGURATION
DHCP Mode
<Enabled>
Enable/Disable IPV4 DHCP Mode
[↓↑] = Move Highlight
[Enter] = Select Entry
[Esc] = Exit

3. If DHCP Mode is disabled, set the following settings:

   - IP address
   - Subnet mask


Intel(R) Management Engine BIOS Extension v9.0.0.0024/Intel(R) ME v9.0.3.1347
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
WIRED LAN IPV4 CONFIGURATION
DHCP Mode <Disabled>
IPV4 Address 10.1.40.214
Subnet Mask Address 255.255.255.0
Default Gateway Address 0.0.0.0
Preferred DNS Address 0.0.0.0
Alternate DNS Address
Subnet mask (e.g. 255.255.255.0)
255.255.255.0_
<Enter> = Complete Entry [Esc] = Discard Changes

4. Go back to Intel® iAMT Configuration, then select Activate Network Access and press <Enter>.

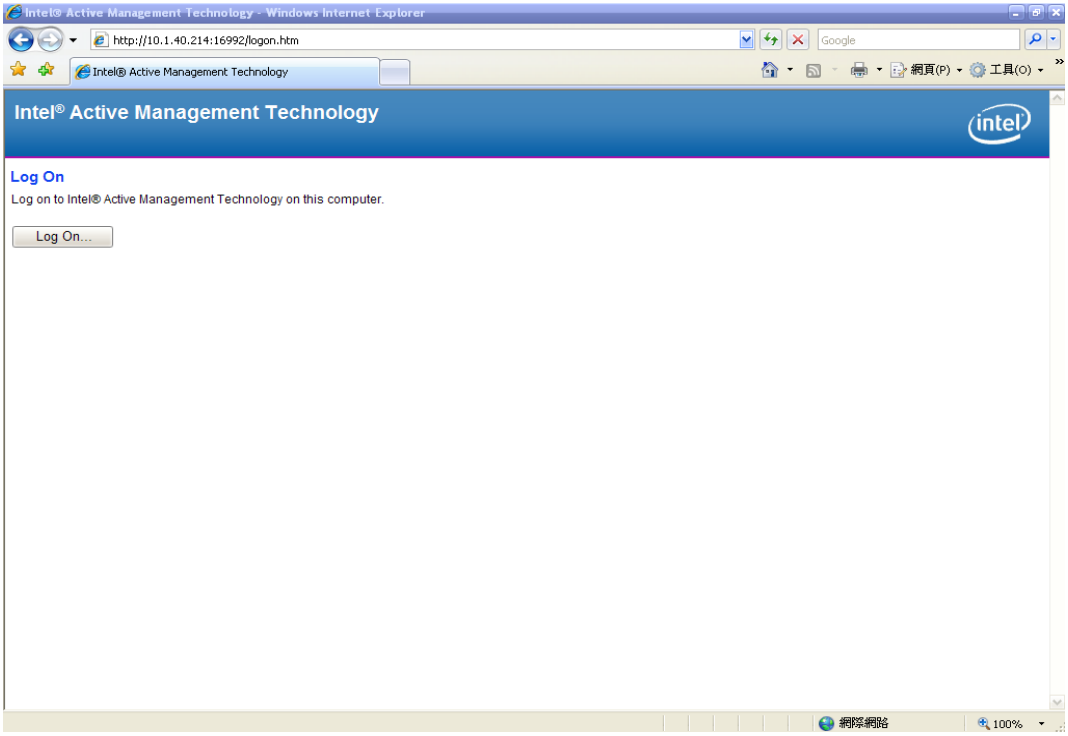

Intel(R) Management Engine BIOS Extension v9.0.0.0024/Intel(R) ME v9.0.3.1347
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
INTEL (R) STANDARD MANAGEABILITY CONFIGURATION
Manageability Feature Selection <Enabled>
> SOL/IDER
> User Consent
Password Policy <Anytime>
> Network Setup
Activate Network Access
Unconfigure Network Access
> Remote Setup And Configurati
> Power Control
Activates the current network settings
and opens the ME network interface
Continue: (Y/N)
[↓↑] = Move Highlight [Enter] = Select Entry [Esc] = Exit

5. Exit from MEBx after completing the iAMT settings.

iAMT Web Console

1. From a web browser, please type http:///(IP ADDRESS):16992, which connects to iAMT Web.

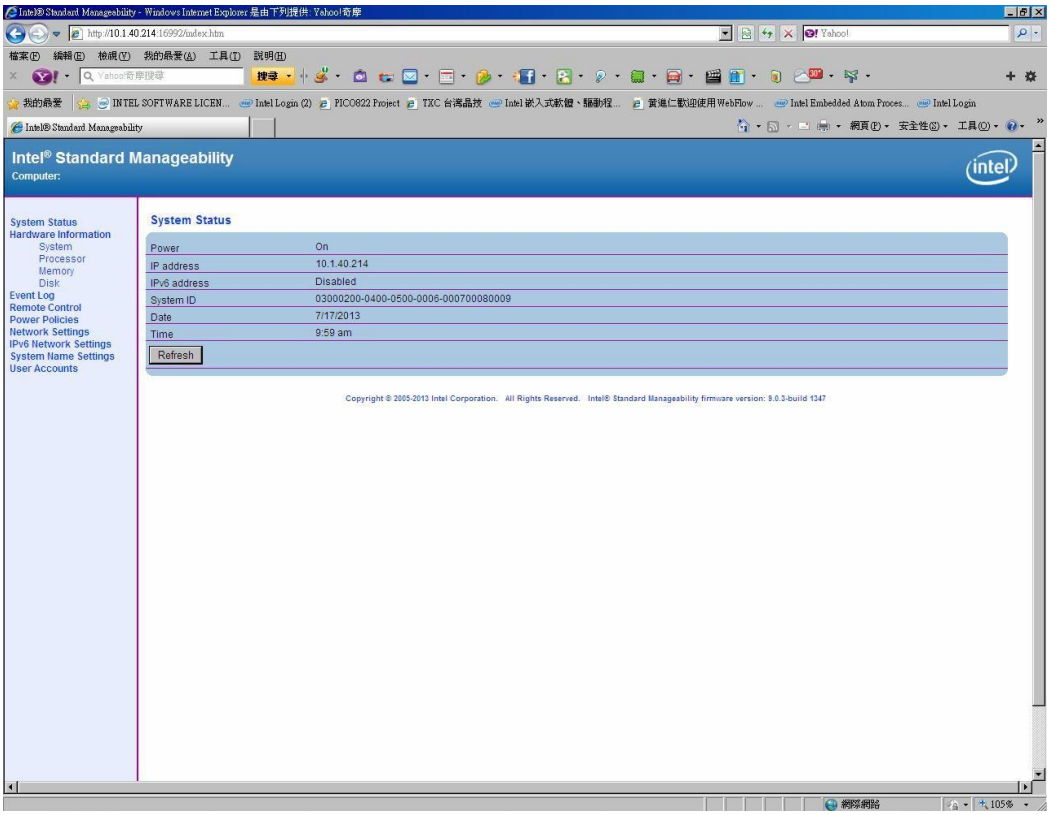
   Example: http://10.1.40.214:16992



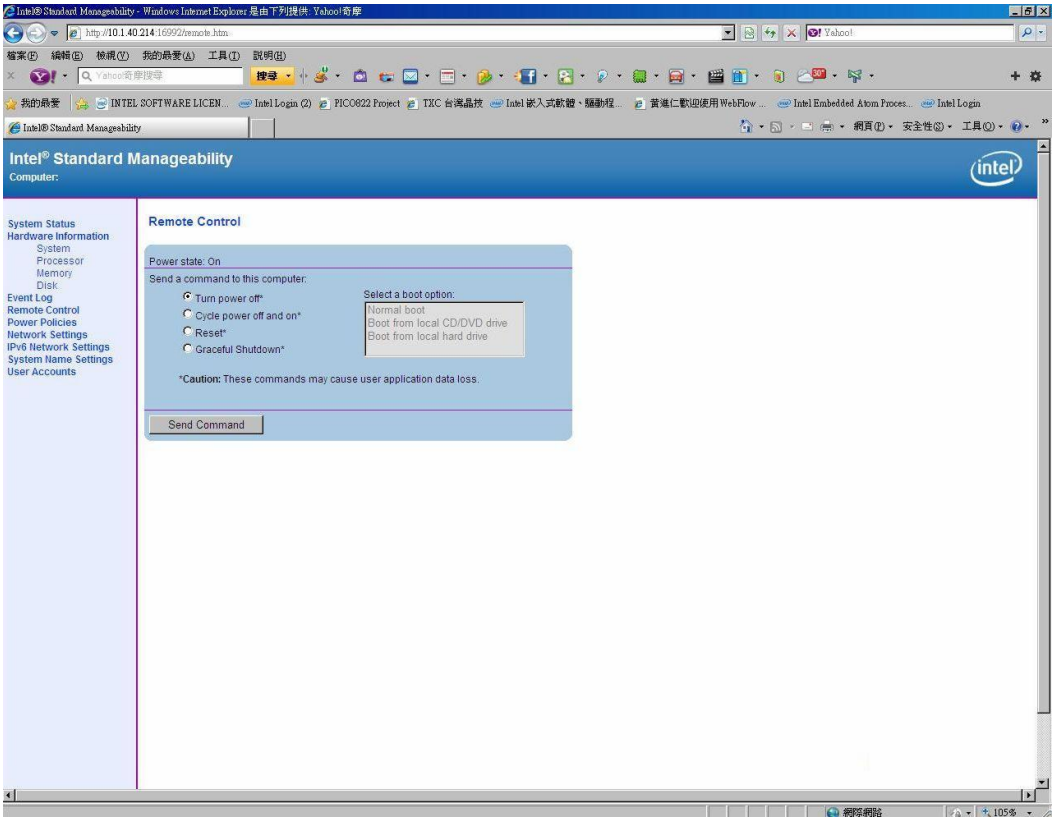
2. To log on, you will be required to type in username and password for access to the Web.

   USER: admin (default value)
   PASS: (MEBx password)

3. Enter the iAMT Web.



4. Click Remote Control, and select commands on the right side.



5. When you have finished using the iAMT Web console, close the Web browser.